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A BI-MONTHLY JOURNAL

DEVOTED TO ORIGINAL COMMUNICATIONS ON MEDICINE,
SURGERY, AND THEIR SPECIAL BRANCHES

EDITED BY

E. C. SEGUIN, M.D.

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ARCHIVES OF MEDICINE.

Original Articles.ARE THERE SEPARATE CENTRES FOR LIGHT-,
FORM-, AND COLOR-PERCEPTION?

BY SWAN M. BURNETT, M.D.,

WASHINGTON.

THAT knowledge of the external world, which comes to us through the medium of the organs of vision, has been broadly divided into three classes: 1, the perception of light or the sense of illumination; 2, the sense of form; and 3, the sense of color.

As the phenomena of each of these classes have pretty clearly circumscribed limits, and can, under ordinary circumstances, be sharply differentiated from each other, they have gradually come to be looked upon in some quarters, as distinct senses; correlated, perhaps, but still essentially independent of each other.

The first to distinctly put forth the idea of a separate existence of white light was Hering, in his theory of the perception of colors. As is well known, this theory rests on the supposed antagonistic action of red and green, and blue and yellow light, and of white light and its opposite, black, on three distinct chemical elements supposed to exist in the retina. Later, Steffan and others embraced the idea, and very recently the views in regard to the separate cerebral centres for each have been formulated and put forth systematically in a brochure by Dr. Hermann Wilbrand.¹

¹ "Ophthalmatische Beiträge zur Diagnostik der Hirnkrankheiten," Weisbaden, J. F. Bergmann, 1884, p. 100.

In this monograph the ground is taken that there are three separate and distinct centres in the brain for the perception of light, form, and color. His theory is ingeniously defended by cleverly constructed diagrams, and an appeal to clinical facts. It has received wide attention among ophthalmologists, and will, probably, on account of its plausibility, meet with an acceptance more or less general. On this account, it has seemed to us important to examine somewhat into its merits, and to see how far it is in consonance with the principles of positive science and clinical observation—for, an acceptable theory on any question involving physics and physiology, must satisfy the demands of both.

It is sought, by this theory, to explain certain phenomena of abnormal vision which have been found associated with affections of the brain. These phenomena are: 1, The absence of the perception of color, the senses of form, and light being intact; 2, the absence of color- and form-perception, the sense of illumination being left; 3, the total abolition of the sense of vision when light-perception is destroyed.

In an attempt to explain these clinical manifestations, the following facts are to be remembered, stating them in an inverse order to the above: 1, that the sense of light is never lost without a concomitant disappearance of the senses of form and color; 2, there is never a loss of the sense of form without an associated loss of the sense of color—with an apparent exception which we shall notice later; 3, the sense of color may be lost, while the senses of form and light are intact.

Wilbrand attempts to explain these facts in the following manner: As the sense of color may be lost while the senses of form and light still remain, he argues that there must be a centre somewhere which presides over this sense, and that this centre must have an independent connection with

the retina. For the same reason, the sense of form must also have an independent centre with a connection with the retina, independent of that of the centre for light and color ; and, similarly, there must be an independent centre with a separate connection for light-perception.

That is all simple and plausible enough, but in order to explain the facts of the unvarying succession of phenomena as described in the preceding paragraph, it has seemed to him necessary to assume a certain connection between the three fibres connecting the centres with the retina. As the sense of light is never lost without carrying with it a loss of the other senses, it is assumed that there is a fibre going from the retina to the cerebral centre which is common to all three, and as it is supposed that the sense of light comes first in the order of centres, an abolition of this centre must necessarily mean an abolition of the other senses, since all the centres are thus cut off from their connection with the retina. When, however, the centre for color alone is destroyed, or hindered in its function, the connection at the centres of form and light are left intact and these senses are unimpaired. When the centre for form is destroyed, the centre for color being cut off from its connection with the retina, its function is also destroyed, and the centre for light alone remains unimpaired.

But in addition to this fibre common to all three centres the centre for form has one which connects it with the centre for light and the retina, and the centre for light has one which connects it independently with the retina. As a result of this arrangement each separate cell in the centre for color has a single fibre bringing it in communication with the retina, which it shares in common with the centres for form and light ; the centre for form has two, one in common with the centre for light and color and one in common with the centre for light alone ; the centre for light

three, one in common with the centres for form and color, one in common with that for form, and one direct and independent of the other centres. From every percipient point in the retina, therefore, there go three separate fibres to the centre of vision in the brain: one to the centre for light, one to that for form, and one to that for color, with the connections above stated.

Into Dr. Wilbrand's scheme there enters an arrangement of the fibres and cerebral cells with reference to the different parts of the retina; but we shall have nothing to do in this paper with any points unconnected with the idea of three separate centres for light, form, and color.

It cannot be denied that this is an arrangement by which it is *possible* to explain the phenomena in question, but it is certainly not in the spirit of modern science to accept such an explanation without some proof, either positive or analogical, on which to base it. The proof in question can only be found in the application of the laws of wave motion as manifested in the domain of molecular physics, in experimental physiology, and demonstrated pathology. Such proof is as yet wanting. The whole scheme is a figment of the imagination, and is furthermore a species of speculation which, if allowed to become common in ophthalmology, will tend to depose it from the high stand it has taken as the most nearly positive part of the science of medicine. It shows, also, to what lengths we may be led when once we lose our hold on the positive data of science, and no longer rest on the basis of fundamental principles.

So far as the physical part of vision is concerned we know that it has to do with wave motion of ether, and the action of this on the ultimate particles of the matter of which the organ of vision is composed. We can afford here to leave undecided the question of the existence, or not, of fibres going from the retina to the brain. No such continuous

structures have yet been demonstrated, but the possibility of a single fibre connecting an ultimate molecule of the retina with one in the brain will not perhaps be denied. It would, however, very much simplify a study of the case if we referred the whole matter to the action of wave motion on a homogeneous structure. If we are to accept Wilbrand's scheme, however, we have *three* distinct fibres connecting every *recipient* element at the retina with every *percipient* element in the brain. That would make sufficiently large draughts upon the physical capabilities of the structures involved, but they are doubly increased if we add the three fibres for the three fundamental colors, as demanded by the Young-Helmholtz theory, making *six* fibres from every element of the retina to every element in the brain.

Such fibres, as every one knows, have not been demonstrated, but it does not seem to have occurred to investigators to question the necessity of their existence, and to seek an explanation more in keeping with the demonstrated laws of wave motion as applied to homogeneous molecular structures. We have endeavored in another place¹ to bring these laws to bear on the elucidation of the question of color-perception.

There is nothing so delicately elective as wave motion in a structure whose molecules are properly adapted in their arrangement to this display of its powers. In such a structure any number of different vibrations will pick their way safely and without the least interference with one another, through long distances.² No one, we presume, will contend for a separate fibre in the small wire of the telephone for every distinct note which goes to make up the human voice in speech, and yet the retina and optic nerve, which are highly organized structures, have not more required of

¹ "Theories of Color-perception," *Amer. Jour. Med. Sci.*, July, 1884.

² Of course it is not contended that these wave motions are transmitted singly as such, but every variation in wave motion is felt in the resultant effect.

them in this particular than the inorganic and (so far as we know) homogeneous substances of which the telephone is made. We have in the organ of vision molecular structures acted on by wave motion, why then, in explanation of the phenomena resulting from this action, should we go beyond the laws which have been clearly demonstrated to apply to similar phenomena in the inorganic world?

When we come to consider the question of three separate centres in the brain, we have passed, it is true, the bounds of physical science, and have to deal with a physiological function and a psychical phenomenon, but even here, we cannot in our attempts to form a theory legitimately go outside the laws which have been found to govern like phenomena.

Let us reduce the physiological and psychical phenomena of vision to their simplest terms. What are light, color, and form? The difficulty with those treating of the subject heretofore has been, it seems to us, that they have not been able to free their minds from the metaphysical system of thought. The words, light, color, and form, are regarded as *entities*, and as having existences in fact, and to be accounted for as such. It is strange that we should have this remnant of the old school of thought engrafted on the positive system of modern science, and ophthalmology is not the only department of thought that has felt its ill-effects.

The phenomena of vision are but the interpretations of impressions made on the retina and carried thence by means of the optic nerves to the brain. Light is only the translation of wave motion into sensation.¹ How this is effected

¹ Plato defined light to be "the power that through the eye manifests color." The same idea (which is the true one), is also expressed by Ruskin in his own inimitable way in one of his latest utterances ("The Storm-cloud of the 19th Century," two lectures delivered at the London Institution, 1884). "Light and sound are *sensations* of the animal frame which remain and must remain wholly inexplicable, whatever manner of force, pulse or palpitation may be instrumental in producing them; nor does any such force *become* light or sound

we do not know. But we do know that when waves of ether of all the lengths which are capable of being perceived act at one and the same time, we have a sensation called *white*; when a limited number or a single wave acts, the sensation is known as *colored*. We know further, *that there is no white light sensation that cannot be resolved into its constituent elements of color-sensation*. In the language of physics, there is no white light that cannot be broken up by the prism into the spectral colors.

White and color, then, being expressions of the effects of wave motion, differing only in degree, cannot be looked upon as distinct sensations. *Moreover, since the whole must comprehend all its parts, white light must include all colored light.*

To suppose a separate cerebral centre for the two, therefore, seems to us about on a par with the proceeding of the philosopher who cut a large hole in his door to admit the cat and a number of smaller holes to admit the kittens.

The sense of form, as far as it pertains to the organ of vision, is but the expression of the idea of extension as represented by the amount and form of the area of the retina impressed. But to call the idea of form a purely visual sensation is erroneous. It is an expression of the judgment which is based on information received by the brain from other sources besides the eye.

The impression received from the retina must be verified by that given by touch before a correct idea of form can be entertained. Long experience has enabled us to supply from memory this second factor, and in ordinary vision, our judgments are formed from the retinal impressions alone, but it is only a process of education which enables us to do it.

except in its recontre with an animal. The leaf hears no murmur in the wind to which it waves on the branches, nor can the clay discern the vibration by which it is thrilled into a ruby."

To use again the terms employed in physics, light (comprehending color) is a *qualitative* sensation, form a *quantitative* sensation. Light and color are the judgments formed on the basis of the character and number of the ethereal undulations; form is the idea based on the extent of the retina affected, together with the knowledge previously or concomitantly obtained through the muscular sense and the sense of touch. As has been stated before these ideas are only the translations of impressions carried to the brain—but is it necessary that there should be a separate centre for their perception? As these ideas are but states of consciousness we would have as much right to suppose a centre for every one of the other million states of consciousness that happen daily in our lives.

In order to avoid a labyrinth of complications we must assume that there is an overruling power of judgment, which takes cognizance of all impressions received, which combines and discriminates, and finally leads to the condition we denominate consciousness. That there is a certain portion of the brain set apart for the reception of particular kinds of impressions is a plausible induction, and is support by many facts in experimental physiology and in pathology. Thus, it is almost certain that there is a particular part of the cortical substance of the posterior cerebral lobe which is intimately connected with the sense of vision, for when it is destroyed the power of seeing is lost. Such a centre will suffice for the reception of all impressions made on the retina, but when we seek to explain how these impressions are interpreted by the faculties of the mind we pass the boundary of physics and physiology, and enter a region concerning the essential nature of which we are in absolute ignorance.

Up to this point, however, we can legitimately go with our wave motion and molecules, in an attempt to account for the phenomena.

Making an application of these laws of wave motion, then, can we consistently explain the three conventional divisions of the visual function—viz: light-, color-, and form-perception—on the basis of one cerebral centre for all? From our point of view, the task is not at all a difficult one. We have already noted the physical impossibility of separating white and colored light on account of the demonstrated fact that white light includes the colors, and that there is no colored light which is not contained, potentially, in the white.

We will assume, for the sake of illustration, that each individual element in the retina has a corresponding element in the cerebral centre, with which it is connected by a single fibre. When one of these retinal elements vibrates in a certain phase, which is set up, we will say, by the ethereal undulation corresponding to the sensation of red; this vibration is conveyed to the cerebral centre, and the corresponding cerebral cell vibrates in the same phase—resultant sensation, red. The same retinal element vibrates to the phase green—which vibration is repeated in the cerebral element—resultant sensation, green. The retinal element vibrates with the ether wave, producing blue; this, repeated in the cerebral cell, gives rise to the sensation of that color; and so on for yellow and all the other distinguishable colors. Let these ether waves, and all the others corresponding to the colors in the solar spectrum fall upon the element at the same time, and the *resultant* vibration phase (according to well-demonstrated laws of physics) will be different from any, and all combinations short of the whole as they differ from each other; this vibration phase, carried to the brain, is reproduced by the cerebral element; resultant sensation, white.

This explanation is simple, in strict accordance with the known laws of the physics involved, and thus fulfills all the requirements of an acceptable working hypothesis.

The idea of form, so far as it comes from the eye, is simply explained by the sensation resulting from the *number* of the cerebral elements (corresponding to the number of retinal elements impressed) affected, and their relations to each other in space.

We have, therefore, in this scheme, but one set of cerebral elements corresponding to the retinal elements on which the impressions are primarily made.

We have not time nor space to enter into an elaboration of this hypothesis in explanation of all the various phenomena of normal and disordered vision. We shall only notice a few manifestations which the scheme of Wilbrand was constructed to explain. These phenomena, as we have noted at the beginning of this article, are the absence of color-sensation (generally in one half of the retina), the sense of form and light being intact, and the presence of the sense of light when both color- and form-sensation are absent. These phenomena are accounted for by W. on the supposition of a destruction in the first instance of the centre for colors, leaving the other two centres unharmed; and, in the second instance, by a destruction of the centres for both color and form, that for light remaining intact.

Cases of hemi-achromatopsia, or defective color-sense in corresponding halves of each retina, are not uncommon. The defect may be partial or complete—that is, some of the colors may still be properly perceived, or it may be impossible to recognize any. Wilbrand gives the clinical histories of six such cases in more or less detail, and the histories of two other cases of “amnestische Farbenblindheit,” in which there existed a want of power to express in words correctly the color sensations. Several other cases have been reported which are not in W.’s list,¹ and among them one by Dr. Eperon in the *Archives d’Ophthalmologie*, for July and

¹ Shoeler reports eight (*Beit. z. Path. d. Shenerv.* 1884), and Noyes two (*Arch. of Oph.*, vol. XI.).

Aug., 1884, which is of especial interest on account of the very careful and complete examination to which the patient was subjected, and on account of a peculiar derangement of other cerebral functions. In all these cases there was a diminished or abolished chromatic sense alone, or combined with loss of form sense, while the sense of illumination remained. This fact in reference to these cases, is to be noted, however, that in none of them, except that of Eperon, was any photometric examination made. Eperon found, in his case, the sense of illumination reduced to $\frac{1}{3}$, and until such examination in other cases reveals a perfectly normal sense of illumination, we cannot accept it as a fact that in complete hemi-achromatopsia there is no diminution of the light-sense. On the other hand, in some of the cases, it is distinctly stated that it is reduced.

In congenital, so-called, color-blindness we have, as a rule, normal visual acuteness, but it is to be remembered that here we are undoubtedly dealing with errors of judgment and not with a pathological condition of the nerve centres.

When there is a pathological alteration in the cerebral centres, its effect must be felt on its molecular structure—in fact, that is the essence of pathological change. The effect of a pathological change in the molecular structure at the centre for vision would, most naturally, be an impairment of the power of the molecules to respond promptly and readily to the wave motions corresponding to the different colors. It is readily understood how delicately organized must be the molecular structure in order that it respond to such very slight variations in wave motion, and how easy it would be to throw it out of its equilibrium. It can also be easily understood how this change in molecular structure might be such as to prevent it from responding to certain wave lengths, while it would be affected by the force of the vibration movement of the whole spectrum acting at once.

On this simple conception is it possible to explain all the phenomena of hemi-achromatopsia that have, as yet, been observed. Moreover, we have a parallel condition in affections of the choroid and retina in which the retinal structure is no longer normal in its molecular arrangements. In a case of extensive choroidal changes which I recently examined there was perception of light over the whole of the visual field, and in the outer, lower and part of the upper inner field there was color-perception which did not depart very markedly from the normal, but in the lower inner field there was no distinguishing of colors. And with this loss of color-perception there was associated in this part of the field a diminution of the sense of illumination. The white square of the perimeter appeared to her to be much "brighter" in the outer and upper and inner field than in that portion where there was absence of color-sensation. In another case of extensive choroidal disease where the visual power was reduced to counting fingers at two feet, there was an irregularly concentric contraction of the field for white. In this field no colors were distinguished except red, which, however, had a "pinkish tinge," and was only recognized in the outer field near the point of fixation. In both these cases the fellow eye was normal. We, therefore, do not believe that there can be an absence of color-perception from pathological causes without a concomitant lowering of the sense of illumination of a greater or less degree. We can conceive it possible, however, that the molecular disturbance may be so slight as to affect perceptibly one or two undulation phases only, the others remaining unaffected. Under these circumstances the sense of illumination might not be much lowered and form-perception intact.

In reference to Eperon's case, it should be remarked in addition, that there was an impairment of judgment in respect to the memory and power of reproducing words

that had been *read*, though those that had been *heard* were more easily repeated. How far this change had affected the judgment of color impressions we have no means of knowing, but it must nevertheless remain a possible factor in the case.

It is a clinical fact, brought out clearly in the cases collected by Wilbrand and others, that when the sense of form is lost the sense of colors is lost also, though the sense of light may remain. No case has yet been reported where the sense of form has been lost while that of light and color remained. Wilbrand accounts for this by supposing that the color fibre going from the retina to the brain passes through the centres for white and form before reaching the centre for color. Therefore, a destruction of the form-centre, must, by cutting off the connection between retina and color-centre, necessarily involve a loss of color-perception.

The concomitant loss of form- and color-perception is much more simply accounted for on the principle of variation in molecular motion. A moderate amount of change would so alter the responsive power of the molecules that they could not act promptly to the waves of the different colors, but yet their position and relation to each other may remain nearly or quite normal, so that when they *are* affected by all vibrations of the spectrum at once the resultant sensation will be projected nearly or quite in a normal manner. When, however, the change is so great as to displace the molecules from their normal position, but not entirely to annul their vibrating power, the vibrations still give rise to a sensation, but the position of the vibrating molecules in their relations to each other is so altered from the normal that they cannot be properly projected by the consciousness, and so no distinct image is perceived, though there may be a general sense of illumina-

tion. The condition has its analogue in opacities of the cornea through which ethereal undulations may still pass; but the rays are so scattered that no image can be formed. In order to have a definite sense of form a certain number of molecules in a definite order must be affected. When the sense of illumination is retained under these circumstances it will most likely be reduced very much in power—and no cases have been recorded in which it approached the normal.

In connection with this part of the subject there is a very remarkable statement on pp. 23-24 of Wilbrand's brochure. He says: "A separate irritation of the color-centre, as a physiological experiment, without a participation on the part of the form and light sense, has not yet been demonstrated, but the bright red color sensation we experience when looking toward the sun with the eye-lids closed is explained by a simultaneous excitation of the light and color centres to the exclusion of the form centre. Leber says (Gräfe u. Sæmisch. v. 1042): 'we see not colors but colored pictures, the form element cannot be separated from color-perception and the centre of both must be the same,' but the two above mentioned cases and the experiment with the closed lids show that there must be the clearly defined centre for form and color, though ordinarily in every picture formation all three centres are affected."

It is hard to believe that scientific men are serious when they adduce such opinions in support of an hypothesis for which they claim attention. I would ask these gentlemen how we are to experience the sensation of a form when there is no image pictured on the retina? In the experiment alluded to, light passes through the partially translucent tissues of the lids and reaches the retina—but the rays are so irregularly diffracted from their course that no distinct image can be formed, and there is only a diffuse lumi-

nosity, the same as when light passes through frosted glass. Its red color is of course due to the blood in the tissues through which it passes. But to say that under these circumstances we can have no sense of *space* is not true, for when the experiment is made with a candle the position of the candle in the visual field can easily be recognized because there is always one part of the retina where the luminosity is most intense, and this is properly projected. It is to be borne in mind in this connection that the sense of form is only a more refined or highly developed sense of projection.

We would call attention at this place to another physiological experiment which, it seems to us, will be difficult to explain on the three-centres theory. We allude to the so-called after-images or the residual sensations of white light. When white light, either direct from the sun, or reflected from as nearly a white surface as we can find, is thrown into the eyes for a few seconds, and the lids are then closed and the hands placed over them so as to exclude all extraneous light, the after-image undergoes a series of changes in *colors*, beginning usually with blue and ending with red. In some of the hundreds of these experiments that I have made, I have noted as many as seven different colors and shades; but *never* after the eye is closed has there been a sensation of white. Have we here a sensation of color independent of white light? Certainly not. Even if Newton had never made his immortal discovery, this simple experiment would be sufficient to establish the compound nature of white light, and it removes beyond the pale of controversy the question of the composite character of the sensation of white.

If white light is a distinct sensation, and has a centre of its own, its after-images should be not colored, but shades of gray, because, in Wilbrand's scheme, while a color-sensa-

tion may include white, the converse is not true, and white does not, of necessity, include colors.

The phenomena in question are easily explained by the theory of the action of wave motion on molecules. White light, holding all the undulations corresponding to all the perceptible colors falls upon the retina and the vibrations are carried to the visual centre. These vibrations vary in intensity and amplitude, according to their corresponding colors, but when they all act *at once*, the sensation is white.¹ When the eye is closed, however, and the retina is cut off from the source of illumination, the vibrations already set up in the visual apparatus still continue in accordance with the law of inertia; but soon some of them stop and then there is a destruction of the equilibrium of the color-forces, the stronger come to the fore, and there is no longer a resultant sensation of white, but of the predominant color or colors. We have not time to examine here into the reason why blue should be the first color to manifest itself, but it is probably due to the fact that, the blue waves being more rapid, act more quickly and forcibly at the beginning, but are, on the other hand, soon exhausted, while the red, though less active, being stronger and having greater momentum, last the longer.

To sum up, then, we do not think the existence of three cerebral centres for the separate perception of form, color, and white has been proven by either anatomical investigation, physiological experiment, or the manifestations of pathological change. Moreover, we fail to see the necessity for their existence, since all the phenomena of normal and disordered vision can be easily and consistently accounted for on the well-known and abundantly demonstrated laws of wave motion in the domain of molecular physics. In accordance with these laws, one cerebral centre is all that is

¹ The so-called color-blind, who sees all colors as modifications of two, calls the sum of all his color-sensation *white*.

necessary. Its molecular structure is in a condition of delicate equilibrium, which allows it to answer promptly to all the vibrations which come to it from the retina—embracing all those which answer to the colors in the visible spectrum. It is able to respond in phases peculiar to any one color, or to any combination of colors, when the resultant sensation will be of *color*. When the phase of vibration answers to all the undulations embraced in the solar spectrum, the resultant sensation will be *white*.

By a process of education we have learned to project the impressions coming from a certain part of the retina (and affecting, probably, a certain part of the visual centre) to a certain position in space. When these projections have a definite outline we have a sense of *form*.

Unless some phenomena present themselves which cannot be accounted for on this theory, we contend that we must, as scientific physiologists, accept it as a working hypothesis until there arise discoveries in the laws of the action of wave motion on molecules with which it is inconsistent. Moreover, we hold it to be dangerous to scientific advancement and truth to promulgate speculations which have not their bases in these fundamental principles.

THE AMERICAN METHOD OF GIVING POTASSIUM IODIDE IN VERY LARGE DOSES FOR THE LATER LESIONS OF SYPHILIS; MORE ESPECIALLY SYPHILIS OF THE NERVOUS SYSTEM.

BY E. C. SEGUIN, M.D.

THE use of potassium iodide in very large doses under certain indications is a slowly spreading practice in this country, and constitutes, I firmly believe, a marked gain in therapeutics. By large doses I mean such as shall make up a total of from 10. (3 ijss.) to 40. (3 x.) in twenty-four hours.

This practice has been in use in New York for fully fifteen years if not longer, in a small circle of physicians whose experience has tended more and more to establish the reality of the advantages obtained by such dosage. After considerable search, and by means of personal inquiries, I have satisfied myself that this plan is originally American, and that reliable tradition indicates that the promoter and prophet of it was the late Dr. William H. Van Buren. I shall present citations from a considerable number of authorities on this matter of dosage of the iodides, in order on the one hand to establish the claim that the giving of very large doses is an American idea, and on the other hand to show how little help many of our text-books afford students and practitioners on such a vital question.

In most of the works to be cited the doses advised are

absolutely too small for successful use in syphilis of the nervous system, and no specific directions are given as to the mode of administering it so as to produce the least gastro-intestinal irritation.

In the first place let us see what the leading authorities on *Materia Medica* and *Therapeutics* say on this subject.

STILLÉ: *Therapeutics and Materia Medica*, Phila., 1874, ii., p. 862, referring to McGregor (*Edinburgh Med. Journal*, xv., p. 309—a mistake) says: “The success of the treatment of tertiary syphilis sometimes depends entirely upon the dose in which the iodide of potassium is administered. Cases which have only become worse or have remained stationary under the usual doses of five grains three or four times a day, will often manifest a decided progress toward cure when ten, twenty, or even thirty grains of the salt are administered at the same intervals.”

CHARLES RICE: *Posological Tables*, N. Y., 1879, p. 62. Dose progressively increased from two to ten and to twenty grains.

SYDNEY RINGER: *Handbook of Therapeutics*, 10th ed., N. Y., 1883, p. 158. Five grains three times a day is generally a sufficient dose. Much larger doses, from ten, fifteen, or even twenty grains are sometimes required. For the removal of syphilitic nodes from the membranes of the brain, from five to ten grains three times a day are generally sufficient.

STILLÉ and MAISCH: *The National Dispensatory*, 3d ed., 1884, p. 123, states that the dose of KI varies from two grains upward; and they refer to ten or twenty grains three times a day as “very large doses.” They make a bare reference to the practice of some specialists in syphilis who give more — as high as three hundred grains per diem.

R. BARTHOLOW: *Materia Medica and Therapeutics*, 5th ed., 1884, p. 228, gives the dose as varying from five to sixty grains.

H. C. WOOD: *Therapeutics, Materia Medica, and Texicology*, 5th ed., 1883, pp. 415-417. States that the ordinary dose of KI is ten grains three times a day. In certain forms of syphilis this may be increased to twenty or even sixty grains.

TROUSSEAU et PIDOUX: *Traité de Thérapeutique et de Matière Médicale*, Paris, 1868, ii., p. 335. Dose from fifteen to sixty grains per diem. On p. 324 they quote Ricord as giving the maximum doses.

GUBLER: *Leçons de Thérapeutique*, Paris, 1877, p. 434. Recommends for adults from one to thirty grains (.05 to 2.) a day. "Small doses" for children.

NOTHNAGEL und ROSSBACH: *Handbuch der Arzneimittellehre*, 3 Aufl., Berlin, 1878, pp. 271-83. The dose is .05 to 1. two or three times a day. In syphilis, consider doses of 2.50 to 3. (forty-five to seventy-five grains) a day sufficient, and larger doses, as 15. (or 5 iv.), "as recommended here and there," as not at all necessary.

BINZ: *Vorlesungen über Pharmacologie*, Berlin, 1884, p. 211. Iodide of potassium is best administered in aqueous solution: from .10 to 2. (one and a half to thirty grains) to be given in twenty-four hours.

Let us next see what our principal teachers of practical medicine say about this matter.

A. FLINT: *Practice of Medicine*, Phila., 1884. The index of this work contains no reference to spinal and cerebral syphilis, or to iodide of potassium.

R. BARTHOLOW: *A Treatise on the Practice of Medicine*, 5th edition, N. Y., 1884. On p. 639, speaking of the treatment of syphilis of the nervous system, Bartholow says: "In these affections the most marvellous change is wrought by sufficient doses of the iodide of potassium; no time is to be lost in its administration, and usually the largest doses are required."

A. L. LOOMIS: Text-Book of Practical Medicine, N. Y., 1884. While treating of syphilis, p. 923, Loomis says that the iodide should be increased to the limit of the patient's endurance, or until the lesion yields to treatment. Again, on p. 956, under the heading of "Pachymeningitis Syphilitica": "The iodide must always be given in large doses; from thirty to sixty grains may be given in from four to six ounces of water, three or four times daily until the desired effect is reached, which is the disappearance of the symptoms."

Before quoting syphilographers and other authorities let us go back to the physicians who originally introduced the iodide of potassium in the treatment of syphilis, and get their views.

Dr. ROBERT WILLIAMS, Senior Physician to St. Thomas' Hospital: "Lecture on the Laws and Treatment of Syphilis," *London Medical Gazette*, vol. xiv., 1833-4, pp. 39-45. Dr. Williams used KI as early as 1831 in a case of syphilis which had resisted mercury; he gave it in doses of five and ten grains in camphor mixture three times a day, with surprising results. In another case of extensive nodes upon the tibiae and digits, with ulceration, doses of eight grains, three times a day, brought about a cure in two months. After this experience Dr. Williams' average dose in cases of periosteal node was eight grains thrice a day. Beyond that dose it purged (!). The mitigating effects of the drug were obtained in from five to ten days.

To Dr. Williams probably belongs the credit of first using and publicly recommending iodide of potassium in syphilis, but the papers of Dr. Wallace of Dublin (*vide infra*), have attracted more attention, and he is often considered the originator of the method.

Dr. JOHN CLENDINNING, Physician to St. Marylebone Infirmary, London: "Observations on the curative proper-

ties of hydriodate of potass. in periostitis and chronic articular rheumatism," *London Medical Gazette*, vol. xv., 1834-5, p. 833 and p. 866. His usual doses were from five to thirty grains, three times a day. The larger doses were given under the direction of Dr. Elliotson¹ with excellent results.

This was in a case of painful node on the cranium (case 2 of paper): as much as 100 grains a day were given with only good effects. Dr. Clendinning advises that KI should be taken well diluted, "on a full stomach and at no other time." Begins by doses of two or three grains, and rapidly increases. Remarks upon certain untoward effects: sometimes heartburn, nausea, flatulence, and diarrhoea, and rarely ptyalism.

DR. WALLACE of Dublin, "Clinical Lectures on Surgical Cases," *Lancet*, 1835-6, vol. ii., p. 5. Also in the same volume, "Lectures on Diseases of the Skin," etc., pp. 743, 688, and 894. In *Lancet*, 1836-7, vol. I., the same lectures are continued on pp. 428, 487, and 553. The observations were made in the Jervis Street Hospital. Dr. Wallace advocates the treatment of venereal disease by the hydriodate of potass or iodide of potassium; he employs a simple solution in water so made as to give the patient about thirty grains [2.] in twenty-four hours. Has never seen any unpleasant effects. Is guided in dosage by the reaction of the urine, and does not deem it necessary to give more than will saturate the urine, *i. e.*, give a deep blue-black color-reaction when tested with dilute sulphuric acid, a

¹ This physician is sometimes (*vide* p. 121) referred to as having been the first to use very large doses of KI., but a reference to the original article, "Lecture on a Case of Scirrhous Uteri," in *Lancet*, 1831-2, vol. i, p. 727, shows that the medicine was not used in syphilitic lesion, but against induration of tissues. The remarks are entitled: "The Hydriodate of Potash; quantities in which it may be safely given." Dr. E. states that it acts as a diuretic, and that he has used it with success in enlargement of the liver, spleen, bronchocele, and cancer uteri. The patient who was the object of the remarks took 3 ij. three times a day in weak mint water, for how long a time is not stated. It is interesting, however, as corroborative of our more modern experience that these doses caused no unpleasant symptoms.

small quantity of starch solution, and 1-2 drops of solution of chloride of lime.

In two patients who accidentally took sixty grains a day there were severe symptoms of gastro-intestinal irritation.

In the third place let us consult some writers upon syphilis of the nervous system.

LAGNEAU: *Maladies syphilitiques du système nerveux*, Paris, 1860, p. 179. Considers quantities of 2. (thirty grains) a day as too small, and that this explains the want of success so often reported. He gives increasing amounts up to 8. (120 grains) per diem.

GROS et LANCEREAUX: *Des affections nerveuses syphilitiques*, Paris, 1861, p. 460. These authors condemn small quantities of from 1. to 2. (fifteen to thirty grains) a day as next to useless, and recommend from 3. to 10. (forty-five to 150 grains) in twenty-four hours.

ZAMBACO: *Des affections nerveuses syphilitiques*, Paris, 1862, p. 583. Claims to follow a happy mean between physicians who never give more than .50 (eight grains) a day and still get excellent effects, and those who give from 15. to 20. (250 to 300 grains) in twenty-four hours. His usual limit is 4. (sixty grains); in some few cases 6. (ninety grains) per diem.

FOURNIER: *La Syphilis du Cerveau*, Paris, 1879, pp. 609-610. Begins with 3. (45 grains) per diem and rapidly increases it to 6. and even 10. (90 to 150 grains). Says he has tried the larger doses recommended by "certain physicians," of from 12. to 20. (200 to 300 grains) per diem without any advantage. If the doses he gives are not successful the larger ones will not be (!!).

HEUBNER: Article on "Syphilis of the Brain and Nerves," in Ziemssen's Encyclopedia of Medicine. Amer. ed., N. Y., 1877, vol. xii., p. 369. Recommends "large doses" of iodide from 1. (15 grains) the first day, rapidly increased to 8. and 10. (120 and 150 grains) in the twenty-four hours.

DOWSE: *Syphilis of the Brain and Spinal Cord*, London, 1879. In chapter v. on treatment gives no doses or mode of administration, but says he has used KI in small and in "excessive doses," but is inclined to be disappointed in his results.

E. L. KEYES: *Syphilis of the Nervous System*, *New York Medical Journal*, Nov., 1870. This able paper is a product of the joint experience of the late Dr. William H. Van Buren and the author, and is the first one that to my knowledge refers to and recommends the use of really large doses of iodide of potassium. The essay should be carefully studied by all interested in nervous syphilis, but for our purposes it will be sufficient to make only a few citations.

First, that in case 30, seen in February, 1870, in consultation with Dr. William H. Draper, the iodide of potassium was given in large doses, varying from ninety grains (6.) a day to 3 ss. (2.) every two hours in an attack characterized by blindness, convulsions, and stupor, with complete recovery.

As early as in 1861, in case 31, Dr. Van Buren gave as much as sixty-seven and a half grains (4.5) three times a day with success.

Conclusion 14 of the essay states our own view of the utility and mode of using KI exactly: "That the iodide of potassium pushed rapidly to toleration, unless the symptoms subside before that point is reached, is the main outline of treatment. That mercury, used at the same time, or alternated with the iodide of potassium, is often of great value in protracted or inveterate cases; and that tonics, change of air and surroundings, frequently influence the effect of treatment in a marked degree, and may become essential to success."

BUZZARD: *Clinical Aspect of Syphilitic Nervous Affections*, London, 1874, p. 134. "A word as to the dose of

iodide of potassium. After a good deal of hesitation and trial of various quantities in a considerable number of cases, I feel convinced that in syphilitic affections of the nervous system it is often necessary to employ doses of this drug which are far beyond those usually ordered. In several instances I have observed something of the following kind to take place. An improvement up to a certain point has been produced by doses of iodide of from ten or fifteen to twenty grains three times daily. The patient has then remained at this stage, or progress has been very slow, whilst he continued to take this amount. On increasing it, however, by rapid steps, to thirty, forty, sixty, or even ninety grains three times a day, the case has responded immediately and *pari passu* to the additional quantity of the drug. I had two patients in the hospital last year who were striking instances of this effect. In each the dose was pushed gradually to ninety grains three times a day with marked beneficial effects, and I may add that the patients themselves expressed an unhesitating opinion upon this point. There is nothing new of course in the employment of large doses. Forty years ago the late Dr. Elliotson used to give as much as 3 ij. (8.) three times a day, and with remarkably good results.¹ But of late years, as a general rule, the dose has been so moderate that to many practitioners the employment of ten grains at a time is only gradually arrived at and with some caution. No doubt in a very large number of cases a comparatively small dose is all that is required, and in practice, therefore, it is well to begin with a dose of ten grains, and increase it if necessary. I feel tolerably sure, from repeated experiments, that the iodide may be used, if occasion requires it, as freely as the bromide of potassium, and that the opportunity of doing great good in syphilitic nervous affections is nearly as often missed by the

¹ Not in syphilis, *vide* foot-note on p. 118.

employment of inadequate doses of the former drug as used notoriously to happen in respect to epilepsy from the exhibition of too small doses of the latter.

"I am in the habit of administering the drug simply dissolved in water, and have not found that any advantage is gained by the addition of ammonia or vegetable bitters."
(Time of administration with respect to meals not stated.)

I have quoted thus largely from Dr. Buzzard because he is the only European writer who has had the intelligent courage to disregard tradition and give KI in doses sufficient to attain the results aimed at. He is mistaken in his reference to Elliotson, but was probably misled by some other author or by tradition in London medical circles.

Let us now seek the opinion of syphilographers.

RICORD'S doses, as cited by Troussseau and Pidoux (i., 324), were from 1. to 4. (fifteen to sixty grains) in twenty-four hours.

LANCEREAUX: *Traité de la syphilis*, Paris, 1873, p. 558. Recommends doses of from .50 ($7\frac{1}{2}$ grains) to 4. (60 grains), and even 6. (90 grains), in twenty-four hours. Denies the efficacy of quantities of 10. (150 grains) to 15. (240 grains) a day, as recommended by "some authors." The astounding reason assigned for this is that the system never utilizes more than a fixed quantity of any medicament (!).

VAN BUREN and KEYES: *A Practical Treatise on the Surgical Diseases of the Genito-Urinary Organs*, N. Y., 1875. These authorities (pp. 569-70) give no limit to doses; they employ (usually) a saturated solution of the iodide in increasing doses until the symptoms yield or the patient can bear no more. They cite a case in which 64. ($\frac{5}{2}$ ij.) were taken daily for two weeks, with the result of checking an ulcer of the throat. They advise giving the drug after meals.

BUMSTEAD and TAYLOR: *The Pathology and Treat-*

ment of Venereal Diseases, fifth ed., Phila., 1883. When speaking of the treatment of syphilitic affections of the nervous system, on p. 712, the authors urge that there is no time for half-way measures. "If the patient has not already taken the iodide of potassium, it may be well to commence with the moderate dose of 1. (fifteen grains) after each meal, for fear that he may be one of those exceptional individuals in whom the iodides exercise a poisonous influence, and if he is found to bear it well, the dose should be rapidly increased. But when his tolerance has already been tested, a dose of 2. (thirty grains), or, in urgent cases, even of 4. (sixty grains) three times a day is not too much to commence with, and it should be increased—say by the addition of .30 (five minims) every other day—until amelioration of the symptoms takes place, or at least 8. (120 grains) for each dose have been reached. At the same time free mercurial inunctions every night should not be neglected."

In their fourth ed., 1879, Drs. Bumstead and Taylor had said substantially the same thing. The iodide is to be given up to 24. (360 grains) in twenty-four hours.

From these citations it is seen that, with the exception of Bartholow (whose extensive clinical experience has given him an advantage), the leading authorities on therapeutics and *materia medica* do not give the necessary information as to the dosage of the iodides, and that they adhere to the *safe doses*, which are without doubt highly dangerous in a negative way, when administered to a severe case of cerebral or spinal syphilis. What is truly astonishing, however, is to find authorities like Nothnagel and Rossbach teaching *ex-cathedra*, without evidence and argument, that quantities of 15. ($\frac{5}{3}$ ss.), or more, recommended "here and there," are unnecessary or useless.

The practitioner will also obtain only insufficient informa-

tion from the works on the practice of medicine, with the exception of Bartholow's and Loomis.' The latter is especially emphatic : " It should be increased to the limit of the patient's endurance."

Nor with the exception of Keyes and Buzzard, are writers on syphilis of the nervous system more advanced. Indeed, one of the highest authorities, Fournier, denies the utility of massive doses which he " has tried," with a contemptuous reference to the anonymous " certains médecins " who have advocated them. Yet he is an open advocate of the heroic treatment of nervous syphilis.

Our two American authorities on venereal diseases, Van Buren and Bumstead, with their associates Keyes and Taylor reflect the advanced New York practice correctly and give, as does Prof. Loomis, doses limited only by the appearance of improvement or by intolerance.

I have remarked at the beginning of this paper that the personal recollections of some practitioners and teachers in New York, had greatly aided me in determining the origin of the practice. Let me quote the following :

Prof. William H. Draper writes me that from 1865 he has realized the utility and absolute necessity of very large doses of KI. in various forms of late syphilis, more especially ulcerating syphilides of the mucous membranes and skin, and in syphilis of the nervous system. His first knowledge of the practice was derived from the late Professor Van Buren. Prof. Robt. W. Taylor tells me that he has been cognizant of the practice of giving the large doses ever since 1866-7, when he heard Van Buren and Draper teach it at the bedside.

Prof. E. L. Keyes who was the pupil, associate, and friend of Dr. Van Buren, informs me that he distinctly remembers hearing him teach as far back as 1863, that very large doses of the iodide should be administered in nervous syphilis—

doses much larger than those then sanctioned by authorities, and nearly as large as those I am writing about.

It is true that Van Buren never wrote upon this important subject; at least Drs. Keyes and E. L. Stimson who have his literary remains know of nothing. The finger of a reliable tradition, however, points back to the distinguished surgeon named, as the originator and disseminator of a mode of dosage which has rendered much good service already.

In this matter, too, a great deal of influential unprinted teaching has been done by Professors W. H. Draper, Keyes, R. W. Taylor and others, which has disseminated the practice far and wide.

The only European writer of note who has, to my knowledge, taken the same stand, is Dr. Thomas Buzzard of London, whose excellent work is dated four years after Dr. Keyes' *brochure*, which he does not quote.

Certain writers (Fournier, Nothnagel, and Rossbach) assert that doses of 15. 20. or 30. of KI. are useless. A negative assertion is much more difficult to maintain in a matter which can only be studied experimentally, than a positive assertion. The positive facts should first be removed or accounted for in some other way, and this has not been done. Simply to state that they have tried the large doses without success is not sufficient to counterbalance the already large accumulation of successful trials.

The American method of administering KI. was developed empirically, on the firm basis of observation in practice. It was found that certain symptoms did not yield with ordinary large doses 8. or 10. (120 to 150 grains) a day; instead of abandoning the drug it was steadily increased, and it was found that the good result showed itself when the patient was taking 15. or 20., or even more *per diem*.

In another series of cases it was seen that some exceed-

ingly acute or dangerous symptoms, syphilitic epilepsy with coma, acute cranial pain, etc., showed signs of improvement in forty-eight hours when the drug was given in doses of 4. every three or four hours.

Such facts have been often observed by the New York physicians I have named, and by myself.

No one has ever claimed that it is desirable to give large doses in all cases of later syphilitic lesions, and I would consider this an absurd proposition. As stated by all recent authorities, many cases of nervous syphilis rapidly improve and get well under moderate doses of, let us say, less than 8. (120 grains) a day. The vital question, however, is what to do for the exceptional cases; those that exhibit no change from such doses.

Let us now inquire into the indications for the use of large doses. Nowhere, to my knowledge, is this point discussed. It is simply stated, that in severe cases the dose should be rapidly increased to a maximum, — "to the limit of the patient's endurance" (Loomis). Bumstead and Taylor lay down a rule of increase (*vide p. 123*) which, I must say, would be dangerously slow in some cases. And, in certain cases too, the usual tentative small doses to determine an idiosyncratic susceptibility would entail a loss of invaluable time.

I would state the indications as follows :

1. Given a case of chronic or subacute (as regards rapidity of progress) ulcerative syphilide or of nervous syphilis, the rules laid down by Bumstead and Taylor may be followed, and the patient gradually brought to take the full doses.
2. Given a rapidly extending syphilitic ulcer, the larger doses, of from 10. to 15. per diem, should be given at once, and an increase more rapidly made in the ensuing week.

If the ulcer be in the throat much difficulty may be experienced in swallowing the dose. There are two ways out of

this predicament. One is to use the rectum as has been done by Van Buren and Keyes,¹ which may be done successfully for several days if the solution be not too concentrated. Another way which I now propose would be the passage of a nasal stomach tube, and the administration of the solution through it from a funnel. The ordinary stomach tube passed through the mouth would cause much pain, and might produce laceration.

3. Given a case of extremely acute syphilitic cranial pain, whether strictly neuralgic, or from nodes, or from a deeply placed lesion. I believe, that the successful practice, and the safe practice, too, is to begin by doses of 4. (60 grains) twice the first day, three times the second, and so on. This would give on the seventh day 32. (or $\frac{5}{3}$ i.) of KI.

4. Given a case of cerebral syphilis in coma, or that peculiar stupor so suggestive of syphilis. There may also be convulsions, partial paralysis, and, in my experience, neuro-retinitis. No time should be lost in such a case, and my practice is to give at once 4. (60 grains), every three or four hours, doubling the dose the next day.

5. The question of large doses in syphilitic hemiplegia is more complicated. In the premonitory period, sometimes so distinct, in which we have localized numbness or localized epileptoid spasms (Jacksonian epilepsy) there should be no hesitation; mercurials and potassium iodide should be given at once in full doses, as in cases of stupor. But when there is actual paralysis, especially when suddenly developed, the utility of very large doses is less certain. The former symptoms were of irritation, or of impending ischæmia, while paralysis often means that nerve tissue has been irreparably injured, or actually destroyed, by softening usually. Under the older teachings that most symptoms of cerebral syphilis were caused by gummata, or nodes, hope

¹ *Op. cit.*, p. 569, foot-note.

might be entertained at almost any stage ; but since Heubner has shown that very often the lesion consists in obliteration of a large artery (endarteritis) with resulting ischæmia of a cerebral territory and its death or "softening," we must modify our prognosis and treatment. In the moment cerebral tissue undergoes the process termed "softening," it is dead, and no amount of KI. or of any other medicine can restore it. The syphilitic lesion, strictly speaking, is amenable to treatment, but its *residua* are not.

Of course, in nearly all cases, mercury is also to be used with great freedom if the case be an acute one, but the iodide is our chief weapon, and with it we should strike hard, repeated blows.

One word as to the rate of increase of the dose in chronic or mild cases where it is not likely that more than a moderate amount shall be required. Bumstead and Taylor recommend adding five grains (.30) to the dose every other day ; a rate of increase which I consider as too slow even for very mild cases, or for little children. A simple calculation will show that in this manner it would require nineteen days for a patient to progress from 1. (fifteen grains) three times a day to 4. (sixty grains)—a waste of precious time in some cases. I usually increase the dose by .30 (five grains) every day ; in some cases by .60 (ten grains)—that is, in mild, subacute cases.

Mode of Administration.—There is nothing to be found on this point in some text-books, and in none are sufficient details given ; yet, how and when to administer a remedy are most important elements of success. As I have elsewhere¹ presented my views on this subject quite *in extenso*, I will now content myself with a few remarks.

¹ "On the use of a feebly alkaline water as a vehicle for the administration of the iodide and bromide of potassium," etc., ARCHIVES OF MEDICINE, vol. vi., August, 1881. "The efficacy of iodide of potassium in non-syphilitic organic disease of the central nervous system," ARCHIVES OF MEDICINE, vol. ix., June, 1883. Both papers in "Opera Minora," p. 529 and p. 579.

First, the iodide should be administered largely diluted in simple water, in a feebly alkaline water, or in milk (Keyes). This statement would, I think, be acquiesced in by all experienced practitioners, and is in harmony with the teaching and practice of many authorities. It is interesting to recall that Williams, Wallace, and Elliotson usually gave the iodide simply dissolved in mint water or in camphor mixture.

Second, the time of administration. On this point a singular unanimity prevails: give the drug "after meals," or "on a full stomach," say all the authorities. Yet, not one of them gives a reason for this direction, not even those whose ostensible object is to teach therapeutics. And, indeed, no good physiological reason could be given for this rule, which I strongly suspect is nothing more than blind following after example. In days when the physiology of digestion was practically unknown, when experimental therapeutics was not begun, the eminent physicians who were the first to use the iodide for syphilis (Williams, Clendinning, and Wallace) said give it after meals, and so it has continued. Now, I have strenuously contended against the giving of decomposable medicines, more especially the iodides and bromides, on a full stomach which contains a highly acid semi-fluid mass. It is almost a certainty, theoretically considered, that these salts are more or less split up by the hydrochloric and lactic acids of the stomach, and pure iodine or bromine set free.

The inactive stomach, on the contrary, is, we know, in just the condition to facilitate the simple absorption of saline solutions without chemical change. It is empty, and either neutral or feebly alkaline in reaction. It is capable of rapidly absorbing a large amount of simple water, and probably can do the same thing with an alkaline solution of iodide or bromide. Perhaps, also, a quantity of the solution

passes into the upper part of the small intestines and is there absorbed.

Again, as to the results of experience. I find that by giving iodides in this way iodism is very rare and gastro-intestinal irritation almost unknown. Patients, who had been previously iodized by 1. or 2. per diem, given in the usual way, I found could take from 20. to 30. with impunity. Furthermore, in at least two of my patients, digestion improved while using the larger doses of iodide of potassium diluted with Vichy water, (probably because of thorough washing out of the stomach). I repeat, the iodide of potassium should always be given upon an empty stomach, say about half an hour before meals.

In the next place about the dosage for children. Influenced no doubt by the extraordinary susceptibility of little children to opiates, many practitioners give them altogether too small doses of many remedies. This is notoriously true of the bromides, and I am sure is also true of the iodide of potassium. For threatening conditions of cerebral disease, meningitis, syphilis, etc., if we decide to give KI we should administer it almost in adult doses. In cases of basal meningitis with neuro-retinitis and in some other cases, I have given from 4. (60 grains) to 8. (120 grains) three times a day to patients between four and eight years old, not only with good result as regards the cerebral symptoms, but also without iodism or gastro-intestinal irritation.

Lastly, I wish it clearly understood, that I admit that there are rare individuals in whom the iodide produces toxic effects, even in small doses. But these instances become still rarer where the remedy is given in the way I advocate. And, after all, "iodism" is in no wise dangerous, it is only an inconvenience and a drawback to treatment. Atrophy of testes and mammae, renal disease, dental decay, are not now recognized as results of the long continued use of the

drug. I have a note from my friend, Professor Bartholow, of Philadelphia, in which he tells me of an instance within his knowledge, in which a patient took 32. ($\frac{5}{3}$ i.) instead of 4. (3 i.) at one time, by mistake. "It caused vomiting and acute iodism, but no serious after-effects."

CONCERNING THE CLIMATE OF NEW MEXICO.

BY W. THORNTON PARKER, M.D. (MÜNICH.)

ACT. ASST. SURGEON U. S. ARMY, FORT UNION, NEW MEXICO.

IT appears to one as if health resorts cease to be *health* resorts when they become easily accessible to invalids. Take for instance, the State of Minnesota, so celebrated as a sanitarium in its early days, when comparatively inaccessible, but since it is possible to reach it so easily, its fame has disappeared—the bubble has burst. The great increase of population, the destruction of forest, the damming of streams, the upheaval of the soil, these and other causes have tended to injure its reputation as a health resort.

The genuine health resort must be able to sustain its reputation for many years. In looking back at regions formerly known as health resorts, how few of them are recognized in the true sense of the term, at the present time. Physicians are constantly urging patients to places remote, wild, and unsettled. One prominent Eastern physician in one morning ordered patients to the following places: One to Colorado, one to New Mexico, one to the Adirondacks, one to the South, and another to Davos Platz; actually priding himself upon the diversity of places selected, and the tremendous distances these unfortunates would be obliged to travel. The rashness with which physicians without any personal knowledge, only from hear-

say, send patients great distances is a disgrace to the medical profession, and ought to be stopped. How any man lacking practical information concerning health resorts can unreservedly recommend them and risk what remains of comfort and even life, is a stumbling block for any well-thinking man. Practical personal *knowledge* is as necessary for the climatologist as it is for the therapist or the surgeon. It is the well-known custom of general practitioners to refuse to attend cases suffering from severe disease of the eye. Why? Simply because they have not sufficient practical knowledge of the subject to treat the patient successfully, and do not care to hazard their own reputation or the safety of the patient by attempting it. In the case of one consulting the average practitioner for change of climate, little hesitation is shown in giving advice which may prove a total wreck to the prospects of the unfortunate sufferer. The importance of careful selection of climate in the treatment of pulmonary and other diseases cannot be over-estimated. In the *Sanitarian* for May, 1882, I have undertaken to give some practical information concerning health resorts, writing only of places I have frequently visited and carefully investigated. It is the intention of this paper to attempt some information concerning the climate of New Mexico. The sections of the Territory of which I will write are the neighborhoods of Fort Union, Las Vegas, and Santa Fé, in the northern central portions, and Forts Selden and Bayard in the south. Although these places are widely separated, the climate is very much the same throughout the Territory, the mildness of the winter of course increasing as one proceeds south.

"New Mexico is situated in latitude 31 degrees, 21 minutes and 37 degrees north; longitude, 103 degrees and 109 degrees west. It contains an area of 121,201 square miles. Large spurs, branching out from the Rocky Mountains,

traverse the Territory from north to south, reaching in many instances an elevation of from 10,000 to 12,000 feet. Immense prairies, between these spurs, form the principal features of New Mexican topography.”¹

“The rest of the country² is a broad expanse of rolling meadow land, at an elevation varying from 7,000 to 6,000 feet, sloping off toward the south, and decreasing in elevation down to 3,000 feet above sea level. Away from the general range, mountains, valleys, and plains are more or less abruptly intermingled. In the words of Dr. Bizzell, ‘Rapid transition and great diversity of elevation, containing within its border deep valleys, gorges, and cañons, associated with mountains and elevated and more or less arid plains.’

“The soil is, of course, a porous one, as is the case throughout the Rocky Mountain region.

“Water courses are few and far between. Such creeks as there are, all have their fountain-heads in the regions of eternal snow. The water is clear and supposedly chemically pure, being largely melted snow. Temperature of mountain-stream water about 58° F.

“Vegetation is as spare as it is in Northern Colorado, notwithstanding the more southern latitude. The pine growths of the mountains and mountain plateaux are not sufficiently dense to impregnate the air with terebinthine odors, and thus to be considered as a direct antiseptic agent for continuous inhalation.”

ELEVATION.

“Every degree of altitude is represented, from 3,000 feet to 8,000 feet and over. The Atchison, Topeka, and Santa Fé Railroad traverses the Territory from north to south. Along its line have grown up the principal towns and settle-

¹ Circular issued by A., T., & St. Fé R. R.

² Dr. Tyndale in *Boston Med. and Surg. Journal*, vol. 108, 1883, p. 265 and p. 313.

ments, representing all the above elevations. Travelling through Kansas on the same road it became clear to my mind that coming from the east through that State, and passing through New Mexico from north to south, an invalid is enabled to make a slow journey, beginning at a comparatively low altitude in Kansas, and travelling westward, to gradually ascend, until an elevation of from 6,000 to 7,000 feet is reached. This may be accomplished without deviating from a straight course westward, and yet to stop at towns of such size as to afford the necessary comforts of life, good food, society, medical attendance, and other things pertaining to civilization. To illustrate this I will give the name of such places, together with their elevations, from east to west on the railroad.

"In Kansas; Topeka, 904 feet; Emporia, 1,161 feet; Newton, 1,433 feet; Larned, 2,015 feet; Kinsley, 2,207 feet; Dodge City, 2,499 feet; Lakin, 3,020 feet.

"In Colorado: Las Animas, 3,959 feet; La Junta, 4,117 feet; Trinidad, 6,034 feet.

"In New Mexico: Las Vegas, 6,452 feet; Santa Fé, 7,013.

"Beginning in the south, at the junction of the Territory of New Mexico with Old Mexico and the State of Texas, the figures run upwards toward the north to Raton, near the Colorado line, as follows:

"El Paso, 3,662 feet; La Mesilla, 3,844 feet; Socorro, 4,665 feet; Silver City, 5,890 feet (not reached by rail); Albuquerque, 5,006 feet; Las Vegas, 6,452 feet; Raton, 7,861 feet."

The first section of New Mexico interesting to the health-seeker is Fort Union, and it would be impossible to describe it better than Dr. Gardner, U. S. Army, who was stationed here, and experienced its trying effects on the newly-arrived. The first days and weeks are in many cases spent in suffering; the altitude is distressing, the constant wind and dust wearying, the tough, disagreeable meat and wretched

food and water simply discouraging, and one is forced to ask the question in despair: What am I here for? After a while these disagreeable impressions wear off, and man, who can accommodate himself to almost any thing in this world, begins to forget his discomforts here, or else to determine to ignore them. Occupation will help to do this, and the summer weather will help to lull one's fears; but when February and March arrive the situation is indeed a serious one, and every protection and possible comfort is needed to carry the invalid or delicate person through safely until June. The experience of Dr. Gardner was much like that which I went through with after my arrival at Fort Union, and for some weeks afterward. It has been the experience of others of my acquaintance, and it must be the lot of many to suffer in the same way. The climate of Fort Union is supposed to be changing, and undoubtedly it is, as well as other sections of our country. The town of Watrouse, New Mex., eight miles south of Fort Union, would furnish very simple accommodations for summer residents, but could not be recommended at all in winter. The inhabitants are mostly Mexicans, and life would be very dull and monotonous. At Fort Union itself no accommodations could be furnished, there being neither hotel, or residents who are not connected with the military post.

"Fort Union¹ is situated in a narrow valley on the eastern slope of the Rocky Mountains, and is about 6,835 feet above the level of the sea. The soil around it is composed of fine sand, with a slight admixture of yellowish clay, and is underlaid by trap-rock and irregular beds of dark lava, which have apparently overflowed from a volcano now extinct, about thirty miles to the northward of the Post.

¹ Dr. W. H. Gardner, U. S. Army, cited in "Circular No. 8," S. G. O., 1875, p. 303.

"Wind from some quarter is almost constant, and the soil being light and sandy, is blown about in clouds of blinding, suffocating dust, that irritates the air passages, and is the prevalent cause of catarrhs, pharyngitis, and bronchitis.

"The diurnal variation in temperature is very great, the thermometer frequently showing at 6 A. M. but 60°, and at 2 P. M. 97°; even in midsummer nights one or more blankets are always comfortable to sleep under.

"Now, from the foregoing causes, viz.: the high elevation, the constant winds, the suffocating dust storms, and the great diurnal variation in temperature, I do not believe this Post can be favorable for any kind of lung disease, and though my medical experience here is limited, I believe it will point to the same conclusion.

"The question of increased altitude as a source of disease has been one of great interest to me personally, and as I suffered as much from it myself as any other case I have seen, I will give you the history of my own case. Shortly after arriving at the Post I was attacked with a fulness of the head, ringing in the ears, mental habitude, and confusion of ideas, dizziness, and headache. Thinking these symptoms might be caused by constipation, dyspepsia, or torpidity of the liver, I took a mercurial purgative, and followed it up with a dose of Rochelle salts, which relieved the fulness of oppression for a day or two, but it at once returned, the dizziness and confusion of ideas increased, and a feeling of numbness and tingling commenced in the fingers of the left hand and gradually spread until it involved the whole left side, even the muscles of the tongue being involved in the paralysis so that I could not articulate. There was also oppression of breathing, throbbing of the carotids, and slight dilation of the pupils. The only medicine handy at the time of the first attack was a bottle of chloroform; and thinking the symptoms might be due to

spasm of the cerebral or pulmonary veins, I poured a dram or two on my handkerchief and inhaled it, when the disagreeable symptoms promptly subsided. The next day, on my visit to Dr. Moffat, of our corps, (who you will recollect was lying here disabled with a broken leg) I told him of my troubles, and he thought they were due to malarial poisoning, and advised me to commence a course of quinia and arsenic, which I at once did, taking twelve grains of quinia and $\frac{1}{10}$ of a grain of arsenic each day. But in the course of five or six days, while under the full influence of these medicines, I had another attack, in all respects similar to the first, coming on after a hearty dinner, which was relieved by a prompt emetic. Shortly after this second attack I was sent for to attend a case of midwifery at Mora (a little town in the mountains, fifteen miles northwest of the Post and about 400 feet higher in altitude), and while there alone I had another attack more severe and prolonged than the other two, and upon this occasion I certainly thought there would be another vacancy in the Medical Corps to fill, for I took emetics, bromide of potassium, and chloroform *ad nauseam* without the least effect.

"The symptoms went off before morning, but when I got back to the post I brought the Darwinian theory to bear on the case. If the environment of an animal be suddenly changed and the animal does not change its habits to suit its environment it will be speedily eliminated. The only radical change in environment I could detect here was decreased atmospheric pressure from increased altitude and consequently deficient oxygenation of the blood. The indication, therefore, was either to supply the deficiency of oxygen to the blood or to reduce the volume of blood to the decreased amount of oxygen. The latter alternative seemed the easiest and the most certain. I therefore decreased the amount of my nitrogenous food, and made up

the quantity by laxative vegetables and fruits, and have been in good health ever since. I have seen two cases since, in every respect similar to mine, and they have promptly succumbed to the treatment indicated : that is, decreasing the amount of blood to the decreased amount of oxygen, by cathartics and decreased animal food.

* * * * *

"One question I should like to add before closing: Are adobe quarters productive of rheumatism? I believe they are a fruitful source not only of rheumatism, but sciatica, and other forms of neuralgia."

Such is the description given by Dr. Gardner, and his experiences will be repeated very often, I have no doubt.

The following table from the Post Hospital records may prove interesting, showing the even ranges of temperature for the years 1880, 1881, 1882, 1883, and 1884.

FORT UNION, NEW MEXICO.—1880.

Mean temperature for January	39.37	Max. 68	Min. 5
" " " February	no observations taken (Steward absent).		
" " " March	39.83	Max. 68	Min. 10
" " " April	51.49	" 74	" 14
" " " May	60.59	" 84	" 29
" " " June	69.97	" 91	" 32
" " " July	67.76	" 92	" 48
" " " August	65.03	" 84	" 41
" " " September	59.76	" 80	" 24
" " " October	47.84	" 78	" 13
" " " November	29.72	" 69	" 15
" " " December	33.49	" 68	" 11

FORT UNION, NEW MEXICO.—1881.

Mean temperature for January	26.25	Max. 62	Min. 25
" " " February	34.68	" 67	" 21
" " " March	37.77	" 69	" 2
" " " April	52.86	" 75	" 5
" " " May	60.33	" 76	" 28
" " " June	73.77	" 94	" 45
" " " July	71.24	" 96	" 45
" " " August	66.80	" 84	" 40
" " " September	59.85	" 84	" 25
" " " October	50.47	" 79	" 18
" " " November	33.27	" 58	" 5
" " " December	37.16	" 70	" 0

FORT UNION, NEW MEXICO.—1882.

Mean temperature for January	29.86	Max. 66	Min. 11
" " February	36.44	" 62	" 0
" " March	41.71	" 74	" 12
" " April	47.98	" 80	" 5
" " May	52.61	" 79	" 23
" " June	65.38	" 91	" 32
" " July	68.58	" 92	" 40
" " August	65.79	" 89	" 36
" " September	60.84	" 83	" 21
" " October	51.38	" 76	" 14
" " November	37.40	" 75	" 4
" " December	33.01	" 66	" 10

FORT UNION, NEW MEXICO.—1883.

Mean temperature for January	29	Max. 61	Min. 30
" " February	32	" 62	" 7
" " March	43	" 71	" 10
" " April	47	" 75	" 9
" " May	58	" 85	" 21
" " June	68	" 95	" 30
" " July	69	" 90	" 44
" " August	66	" 85	" 42
" " September	60	" 86	" 27
" " October	48	" 75	" 15
" " November	41	" 71	" 5
" " December	34	" 69	" 2

FORT UNION, NEW MEXICO.—1884.

Mean temperature for January	31.56	Max. 65	Min. 13
" " February	34.75	" 67	" 21
" " March	39.30	" 63	" 9
" " April	43.61	" 72	" 15
" " May		" "	" "
" " June		" "	" "
" " July		" "	" "
" " August		" "	" "
" " September		" "	" "
" " October		" "	" "
" " November		" "	" "
" " December		" "	" "

The total rain and snow fall for Fort Union for the years 1880, 1881, 1882, 1883, were as follow:—

1880, . . . 19 inches, 1882, . . . 9.41 inches.

1881, . . . 22 " 1883, . . . 14.50 "

Concerning the dryness of New Mexico the average hu-

midity is about 38%, while in the following States and localities it is as follows :¹

"New England States, 75%, Middle Atlantic States, 74%, South Atlantic States, 79%, Gulf States, 82%, Lower Lake region, 70%, Upper Lake region, 70%, Ohio Valley, Tennessee, and the Northwest, 73%, Lower Mississippi Valley, 58%, Denver, Colorado, 42%."

The "rainy season" commences in June and lasts through the summer and fall. By rainy season we refer to occasional showers perhaps daily for a week or so. Now and then a terrific hail storm will rage for a short time, followed by rainy and cool weather. May 31st, a severe hail storm visited this Post smashing hundreds of panes of glass and doing considerable damage otherwise. The hail stones were very large, some quite the size of eggs. The houses were flooded with water, and it was very cold for a week or two, fires being necessary in all the rooms. From the middle of June the sun shines with intense force, making out of doors occupation almost impossible, but, strange to say, cases of sunstroke almost never occur. The constant wind in New Mexico is a great protection to those who are exposed to the strong rays of the summer heat. About three or four o'clock in the afternoon clouds will appear, followed by wind or rain, and the evening and nights are cold. These sudden changes, together with the action of the water, excite a loose condition of the bowels, and diarrhoea, and even dysentery are of frequent occurrence. The high altitude affects most people very unpleasantly, at least for a time, and many suffer until they leave the country. "Nervousness," neuralgias, and all heart-trouble seem to increase. A strong desire to sleep, but awakening without much sensation of refreshment, if any. Weariness, languor, confusion of ideas, inability for exertion, or study, depres-

¹ Circular A., T., & St. Fé R. R., concerning New Mexico.

sion of spirits, almost to despair, are common ailments due to this climate and elevation. Fast walking and running are out of the question, and troops are not allowed to be drilled in the "double quick." Loss of appetite, indigestion, dyspepsia, and biliousness show that the intestinal tract is affected by the change. Colds, catarrh, etc., are very prevalent; and pneumonia is rapidly and generally fatal. The houses are mostly built of "adobe," sun-burnt brick, and are cold and chilly, except in the hottest weather. Rheumatism on this account is *very* prevalent and severe. Glandular inflammations are common. Simple adenitis of the groin, without apparent cause, is very common.

If I may be pardoned in this paper for mentioning servants, I would say that it is almost impossible to get any, and ladies coming from the East and attempting housekeeping without servants soon lose health and strength, if they are not permanently *aged* or completely broken down. From amongst the lazy, shiftless population of natives it is quite impossible to obtain help, and ordinary "niggers," who would not be tolerated in well-regulated eastern homes, receive from twenty-five to thirty dollars a month and are hard to find at that.

All living expenses are very high, and life at best is perplexing, discouraging, joyless, and tends to despair. There is nothing to cheer or to interest one. Even the bravest, who shot off with many plans and energetic promises, soon fall off into the dreary humdrum struggle for an existence. The desperate character of many of the inhabitants forbids a moderate investment in either cattle, mines, or farms, and the country is so covered with Spanish land grants that it is hard to obtain any just title. The whole region has, in my opinion, been over-estimated in every particular. It cannot be claimed that I have any interest in making these statements, which seem any thing but complimentary. I am not

a discouraged adventurer here, neither have I any reason to speak ill of the land in an unkind spirit. I endeavor in this paper to do my duty in explaining, as fully as I am able, to the many in the East who may be ordered here and tempted to come for health and life, the state of affairs they must expect to find. Leaving comfortable homes and loved friends to come out to this wild, semi-civilized, inhospitable region, to spend all their money and hope, and at last to go back discouraged and weakened, or to be returned *dead*. Many undoubtedly come here too late, *some* come and are benefited, but, alas! how few, and at sacrifices which make life itself an expensive luxury. For the wife or mother struggling here with such patients to take care of, the blame for ordering the family out West to New Mexico, if it is to be placed on any one's shoulders, must be, or ought to be, a heavy load to carry. Some, discouraged and rapidly sinking, hasten home with wife and children, and *die on the cars*. Consider for one moment the anguish of death in such a position, and the difficulties of widow and children, cut off from the consolations and assistance of friends, perhaps without money, and at the mercy often of unprincipled scoundrels. It may happen some true-hearted man is at hand to help honorably, but, alas, it is not always, if even occasionally, the case. The death of patients amongst strangers is always hard, even at our health resorts in older lands—imagine for a moment the sickening experience in the wilds!

There is, however, one feature of New Mexican life which is to be remembered, and that is the glorious sunshine. Even in the midst of depressing, demoralizing dust storms, the sun shines out to encourage and cheer and show us that the God of nature still reigns. Then, too, the snow-capped peaks of the "Rockies," rising to a grand height, add beauty to the scene, and form a striking frame-work to the

picture of this wild land. The early mornings are beautiful, and the refreshing evenings are thoroughly enjoyed.

If it were not for the blinding dust storms, which suffocate and make facing them while walking or riding well-nigh impossible, there would be much to admire; but the dust destroys all hope of falling in love with the country, and when this, the greatest evil, is added to all the others I have mentioned, life in New Mexico has verily few attractions. The poverty-stricken soil is so seldom refreshed with rain that the cultivation of vegetables is almost impossible, and those to be obtained from the Mexicans are miserable and very expensive. The meat is generally poor and tasteless. The winters draw so heavily upon the sustaining powers of the cattle, that during a greater portion of the year they are poor and tough and not fit to eat, although they are supplied as food, and no other meat is obtainable except a little mutton, as miserable as the beef. Poultry is very hard to find, and of an inferior quality.

Probably the pleasantest spot in the whole Territory, and the healthiest, unless we except Santa Fé, is the Las Vegas Hot Springs region. The Springs are beautifully situated about seven miles from the town of Las Vegas (the meadows) at the entrance to the Gallenas cañon. They are set in the midst of the foothills so cosily that violent wind and dust storms lose most if not all their tormenting power. The altitude of the Springs is six thousand seven hundred feet above the level of the sea.

The Springs are easily reached by a branch of the Atchison, Topeka & Santa Fé R. R., and the ride from Las Vegas is indeed a pleasant one. The railroad company, with considerable enterprise, have spent large sums of money in making improvements, and few places west of the Mississippi can boast so many attractions. Dr. Gordon, lately of the United States Army, is located permanently at the

Springs, and patients sent to his care will receive the best professional attention possible. There are from thirty to forty of these celebrated springs, situated at the base of a foot-hill sloping down into the Gallenas river.

"In their thermal properties they are divided into two classes: One including springs of a temperature from one hundred and twenty degrees F. to one hundred and forty degrees F.; the other springs varying from seventy-five degrees to one hundred degrees F. There are thirty of the former and ten of the latter.

"Twenty-five of the principal springs have been excavated, so as to form reservoirs, and have been walled and covered with the native red sandstone. Many of the springs are not at present required for the bath-house supply. A single spring, No. 6, furnishes, alone, thirty thousand gallons of water daily, at a temperature of one hundred and forty degrees F.

"The warm springs flow from these basins or reservoirs direct into the bath-houses, while the cooler ones run into large tanks upon the hillside, and are thence conducted into the bath-houses to furnish cold water as required.

"The skin after taking a bath in these waters has a soft velvety feeling and a freshness of aroma savoring of the cosmetic."¹

These baths furnished at the Las Vegas Hot Springs are supposed to be beneficial especially in rheumatic, scrofulous, and other affections, and are useful in many forms of skin diseases. There are two bath-houses, one for the ordinary hot, cold, and vapor baths, well arranged and very comfortable, and the other a rudimentary affair for mud-bathing. The main bath-house is built of stone, and is really a handsome structure, two stories high and two hundred feet long by forty-two feet wide.

¹ Circular, A., T., & Santa Fé R. R.

The bath-rooms are in the lower story, the upper being occupied by the offices of the physicians, drug-store, post-office, bath-office, etc. The bath attendants are at present excellent, and have been carefully selected. It is claimed that the entire capacity of both bath-houses is 1,000 baths per day, but of course the number of bathers do not require so much attendance as yet.¹

Separate apartments with complete bathing apparatus are furnished those suffering with contagious diseases.

The baths are given at a temperature of from 90° to 100°.

The mud baths given at these springs are similar to the celebrated peat baths of Franzensbad, Bohemia. "The percolation of chemical water for centuries through the earth surrounding these springs has produced this peat, or mud. Viewed under the microscope it appears gelatinous, its earthly properties having undergone a change."

The average temperature of the mud bath is about 108°.

One hundred and six degrees is probably the best, and is very agreeable.

The average duration of the bath is one hour, but the time may vary from thirty minutes to three hours. One bath is usually taken each day. Upon leaving the tub the patient is washed off thoroughly under a graduated douche, and after being "hosed off," is then rubbed down clean and dry, and placed on a comfortable couch in the "resting room" for half an hour. The bath is supposed to act like

¹ The baths, including attendance, towels, etc., cost as follows :

Shampoo baths	Each	\$1 00
Electric "	"	1 00
Medicated "	"	1 00
Vapor "	"	75
Vapor and pack baths	"	1 00
Tub baths	"	50
" and pack baths	"	75
Mud baths, singly	"	3 00
" " three for \$5 00 ; five for \$8 00 ; seven for \$10 00, and ten for	12 50
Special treatment, Massage	7 00
Massage at time of taking bath	50
Bathing hours, 6 A. M. to 6 P. M.		
On Saturdays, bathing hours 6 A. M. to 10 P. M.		

a huge poultice, extracting by free diaphoretics, or sweating, diseases that have baffled skilful physicians both at home and abroad. The pack and massage are often ordered to follow the mud baths as a re-inforcer.

In preparing the mud baths, the mud is first freed from all foreign substances, such as sticks, stones, etc. Each tub is then half filled with mud, and mixed up with the warm spring water, to the consistency of paste. The bath is warmed up by steam at bathing time to the required degree of heat ordered by the physician in charge of the patient. Every five days *fresh* mud is ordered, and the old mud cleared out. It is amusing in passing through the bath-house to read the labels. Mr. S.'s mud: Rev. Mr. D.'s mud; Mrs. A.'s mud, and so on. The boxes look like coffins, and the bather is held down in the tub by a board placed across the chest and firmly fastened down; otherwise he will rise on top of the mud. It is said that at first ladies shrink from entering the repulsive stuff, and can hardly be forced to do so; but having once enjoyed the bath, it is hard to keep them away from it!

At the Hot Springs there are several local attractions in connection with the hotels—museum of antiquities, aviary, zoölogical collection, etc., besides a large green-house, well filled with floral and variegated plants. The hotels at the Springs are in postal, telephonic, and telegraphic connection with Las Vegas and the outside world. The hotel rates are from \$3 to \$4 per day—\$17 50 to \$24 a week. There are several cottages upon the grounds where private board at reasonable prices can be obtained.

The next most desirable residence for the temporary visitor to New Mexico if not altogether the best place in many respects, is the old city of Santa Fé. It is at first a forbidding place but one learns to like it, and although the native inhabitants are mostly dirty uninteresting people,

really delightful society is to be found in Santa Fé the year round. Living expenses are high in Santa Fé as elsewhere in the West, and servants few and hard to find—but compared with all the other towns in New Mexico, Santa Fé is certainly the most comfortable. The same climatic advantages and drawbacks exist here as at Las Vegas and Fort Union and other New Mexican towns. I attach to this paper another report from the "Army Records" showing the characteristics of the climate and some of its disadvantages:

"The city of Santa Fé¹ is pleasantly situated on an extensive plateau on the western slope of the Rocky Mountains at an elevation of 6,850 feet above the level of the sea, and in latitude $35^{\circ} 41'$ north, longitude $28^{\circ} 59'$ west. To the north and east rise the foot-hills and peaks of the Rocky Mountain range; on the south the plateau is gradually lost in spurs of mountains shooting out of the main range, and on the west it terminates somewhat abruptly in the valley of the Rio Grande. * * * Fort Union is distant about 100 miles to the eastward. * * * To the south runs the main road to Albuquerque and Southern New Mexico, and less important roads to the neighboring towns. The Rio Grande runs in a southwesterly direction from Santa Fé about eighteen or twenty miles distant at the nearest point. A small mountain stream—a tributary of the Rio Grande—called the Rio de Santa Fé nearly bisects the town. The soil of Santa Fé and vicinity is dry, light, and sandy and yet very fruitful. The country for miles about Santa Fé is destitute of trees. The large growth is said to have been cut away at an early date in the history of the place for fuel and for better security against hostile Indians, and a subsequent growth of large trees has

¹ Information concerning Santa Fé, New Mexico, furnished in "Circular No. 8," Surgeon-General's Office, by Surgeons Alexander and Huntington, United States Army.

not appeared, though stunted cedars and pines are very common. This want of vegetation detracts much from the natural beauties of the town and vicinity. On the hills toward the mountains are found large pines and cedars. The piñon, a species of pine, furnishes the almost sole supply of fire-wood. It is brought for miles on the backs of donkeys, and sold by the load in the plaza at from twenty-five cents to one dollar, according to the season of the year or severity of the weather. The natural drainage of Santa Fé is excellent, and is materially assisted by an extensive system of *acequias* or canals around the town. Still, little attention is paid to the subject and many of the narrow streets and lanes of the city are excessively filthy. The river water is very extensively used for drinking purposes and is excellent. Good water, but a little impregnated with lime, may be obtained by wells at a depth of from ten to forty feet.

"The population of Santa Fé is about 6,000, of which the larger portion is Mexican and Indian, or an admixture of the two. The American element is rapidly increasing and already has the chief influence in matters of trade and politics.

"The place is irregularly built of adobe, and when seen from the approaches of the town has an exceedingly uninviting appearance. The houses are generally built on the Spanish plan, a quadrangle with an interior court yard, the entrance being through a gateway generally kept closed. The older portions of the town are built upon narrow lanes and passage-ways rather than upon streets. The better portion is the more recent, and is inhabited by the American residents. The plaza holds a conspicuous place as a business centre and about it are the civil and military offices."

To the excellent description from which I have just quoted is appended a communication from Dr. Smith,

of the United States Army concerning the climate of Santa Fé for invalids. His remarks are very valuable and should be given considerable weight in selecting this climate for pulmonary patients.

" From an experience of fourteen months and upon rational grounds, I cannot coincide in the popular belief that Santa Fé and the contiguous localities, of equal or superior altitude, are well adapted as a residence for persons suffering from pulmonary tuberculosis, heart disease, or any cause producing obstruction to free and ample respiration. The universal testimony is, so far as I can ascertain, that a stranger to the rarefied atmosphere, however sound his pulmonary and circulatory organs may be, is almost invariably affected by a great oppression in respiration upon his advent into this elevated country, accompanied naturally by an unwonted lassitude and indisposition for exertion.

" There have been in the case of two or three of my acquaintances ugly symptoms of a partial paralysis of the organs of locomotion and speech. A continued residence, however, is said to overcome these unpleasant effects in persons of *sound* and *robust* health, and from the number of Americans and Germans residing in the higher regions of New Mexico, who transact their business at no small expenditure of physical exertion, I believe this to be the case, and that *in time* an accommodation obtains between the lungs and the somewhat diminished quantity of oxygen.

" As regards the *invalid*, whose breathing apparatus is crippled by tubercular deposit, by chronic pneumonia, or whose blood, whatever may be the cause, requires full aeration, I deem it worse than useless for him to endeavor to regain health or even comfort in such localities. I regard my lungs (and my chest measurement is forty-four inches) as perfectly sound, and yet, after reporting for duty in Santa Fé, I could not, as a general rule, breathe comfortably, al-

though at times, when a damp atmosphere prevailed, I could not notice any impediment to respiration. The past summer (1874) was exceptionally warm and I was at intervals asthmatic to a terrible degree, crushed actually by a feeling of impending dissolution. The common advice to me was 'Wear it out; you will be all right next year.' No sooner, however, had I started East than my troubles, as I descended in altitude, lessened proportionably."

The places south of Santa Fé in my opinion become less and less desirable, although one seeking a very mild winter climate might try Silver City if suitable accommodations could be found. For a single man a certain kind of living might be put up with for a time, but for the invalid, or for an Eastern family used to comforts and even luxuries of life, a residence further south than Santa Fé or Albuquerque is, in my opinion, undesirable. The Rio Grande valley has some advantages in its mild winter and absence of snow. The summers are said to be cool and pleasant, but when I rode through on horseback in 1867 I found the climate hot enough. The best opinion concerning the climate is to be found in the reports of the medical officers to the Surgeon-General's office and those on Fort Selden and Fort Bayard now presented. The climate was the same then as now and the officers who made the reports did so only after careful investigation.

"Circular No. 8, Surgeon-General's Office, Fort Selden, New Mexico." Report of Dr. Jessop, U. S. Army :

"Fort Selden is situated on a sandy basin one and one half miles from the Rio Grande, in southern New Mexico. Latitude $32^{\circ}25'$ north; longitude 30° west; altitude 4,250 feet. Fort Cummings, fifty-five miles west—Fort Bliss, Texas, sixty-seven miles south (nearest town La Mesilla).

"Lung troubles are comparatively rare at Fort Selden, as are all diseases of the respiratory organs, excepting catarrh, which I prefer to consider separately from bronchitis, as it mostly affects the mucous membranes of the nares, tonsils, and larynx, and, I

think, seldom extends even to the trachea. It seems to be produced by the almost constant drifting of the irritating dust peculiar to this region, and few new-comers who are much exposed in the open air escape it. It gradually wears off as they become acclimated. Women, from their in-doors habits, are usually freer from it. The native New Mexicans are not at all affected by it. Many of them, however, suffer from a form of bronchitis, induced it is thought, by their peculiar fashion of smoking the cigarita, *i. e.*, by inhaling the smoke into their bronchial tubes and exhaling through their nostrils. The climate of this part of the valley of the Rio Grande will improve and probably tend to the cure of many patients afflicted with commencing phthisis, but only by a residence here, not a sojourn of a few months. I think I am within the mark in stating that it will take from eighteen months to two years to acclimate them. To those in advanced stages of consumption, no such benefit can accrue. Added to the annoyance of the dust-storms, are the distance from home and the impossibility of obtaining many of the comforts, and especially the varieties in food, which the sick always crave. The prognosis is extremely serious if diarrhoea be a complication, and here I may observe that all cases of chronic diarrhoea appear to do badly at this Post, and that, with my present convictions, I would not suffer, if it could be avoided, a patient laboring under this disease to remain at Fort Selden or any point where the Rio Grande constituted the water supply. The enervating nature of the climate has doubtless much to do with the ill-success attending the treatment of such patients. As regards chronic bronchitis, I can only speak for New Mexico, and, for that disease, I consider the climate of this region as the best in the Territory."

Near Ft. Bayard is a bright little town called Silver City, which I have already briefly referred to. Grant county is considered one of the best counties in the Territory, and the business enterprise of Silver City is very much in its favor. The town is pretty well supplied with stores, and living is not quite so tiresome here as at many other places in the Territory. Ft. Bayard is situated in the extreme southwest corner of the Territory, in latitude $30^{\circ} 40'$ north, longitude $31^{\circ} 25'$ west, at an altitude of 6,022 feet.

The military Post is one of the most delightful in the

West, and a great favorite with the Army. Diseases of the heart do badly here, and the climate, excepting that it is milder in winter, is much like the northern sections already described. It is a long way from home for the invalid, and summer "*wash-outs*" on the railroad make the States seem very far away indeed sometimes.

"Circular No 8, War Dept., Surgeon-General's Office, 1875. Fort Bayard, New Mexico." Report of Dr. Wilson, U. S. A.

"In bronchitis, either acute or chronic, this climate is unfavorable either for cure or relief. The air is too rarefied and too stimulating, and acts almost as an irritant to the bronchial mucous membrane. I have also observed in even slight cases of catarrh attended with cough, that they are very intractable. I have seen several cases of phthisis, and have one at the present time under my charge, but I have not seen any beneficial results produced by this climate. They have all gone on from bad to worse, and finally died. I believe that it is only in the very early stages of tubercular disease that this or any other climate can exert a beneficial influence. * * * There are, so to speak, two classes of cases, one of which is characterized or accompanied by a dry hacking cough, but with little expectoration and a tendency to haemoptysis. In the other, there is copious secretion from the bronchial mucous membrane. This latter class would be benefited by a mild, dry, climate not subject to sudden changes and of a lower altitude than this, say 2,000, or 3,000 or 4,000 feet. The former class would lead a life of torture here, and this climate or one similar to it would only add to the mischief already done. They would be benefited by a mild, moist climate in close proximity to the sea. Phthisis is almost unknown among the Mexican population here, notwithstanding their filthy habits, probably on account of their living nearly all the time out of doors and being natives of the soil and accustomed to this climate. I know that horses brought here from the States, and cattle introduced here go down in condition for the first year until they are acclimated, and I believe that the human race require also a certain time for acclimation."

In summing up the *advantages* of the New Mexican climate we find first a considerable degree of *elevation*. Dryness is

very decidedly present. Vivenot¹ classifies moistures as follows:

Dry, below and up to 55%.

Moderately dry, 56 to 70%.

" moist, or moist, 71 to 85%.

Excessively moist, 86 to 100%.

Referring to the tables taken from A., T., and St. Fé R. R. circular we see that New Mexico can boast of a *very dry climate*. The percentage of clear sunshiny days is very great, and the amount of inclement, disagreeable weather is proportionately small. One can get out of doors for a considerable part of the winter. The *disadvantages*, and they are many, have been mentioned. The principle one is the *great elevation*. Here we have the advantages and the disadvantages of *elevation*, and it is hard to say which are greatest. It is worth while to mention that when "the country in the northwest, middle, and eastern States, is ice-bound and frozen, the residents of New Mexico are basking in genial sunshine."

Undoubtedly this paper may be read by English people contemplating a visit to the Southwest. To those used to the climate of England, only excepting the beautiful Isle of Wight and the grand south coast, New Mexico will prove an interesting, and I believe, in many respects, a profitable change; but—and it is a large *but*,—we have in the United States many desirable climates: the Adirondacks, the Mountains of Tennessee, the regions of Moosehead Lake, Montana, and last, but not least, the glorious climate of Colorado. The warm climates may be good, and the mild winters desirable, but the evidence lately seems to show that the cold clear climate of Colorado is the best for cure, and the best in the end, and the happiest home for the invalid obtainable. In coming to this climate and to this

¹ Quoted by Dr. Tyndale in *Boston Med. and Surg. Journal*, *l. c.*

country, and leaving behind the comforts and luxuries of the last, and accepting Western hospitality is a great change indeed.

To the average Englishman, accustomed to his comfortable home and well-regulated table, be he in robust health or an invalid, the American hotel, and especially in western towns, is simply discouraging. To the West people flock for money-making, and personal comforts are of secondary consideration. The invalid must take his chances with the rest. Rents are high and separate houses are hard to find—one must choose between the hotel and the boarding-house. The first-class hotels are, of course, very fair, but the charges are exorbitant, considering what one gets. The boarding-houses are simply unendurable, both as regards food and accommodations generally. Society is, of course, very much mixed, although there are always some agreeable people at all places.

For one, however, willing to endure hardship and take life just as he finds it, and with plenty of means at his disposal, and who can plan and carry out the journey comfortably, it may be well to seek the American health resorts of Colorado or New Mexico. When we consider the bright sunshine, so generally present, and the invigorating, healing atmosphere, which is especially obtainable in Colorado, and the opportunities for out-of-door exercise, and the possibility of regaining health, the journey is worth all the trouble and expense and suffering. It is important to know where to start for, and the proper route to take, besides the time of year and the expense. It is best in going to Colorado to make Denver the first objective, and for New Mexico, Santa Fé or Las Vegas Hot Springs.

The hotels are constantly improving, and better attention is paid to the comfort of guests. New houses are constantly being built, and conveniences, which are so necessary for

the invalid, are also increasing each year, and better protection against the winds and dust are constantly being afforded. A well-filled purse is, however, of the first importance, and to creep along with insufficient means only brings unhappiness and disaster upon those attempting it. Certainly it is quite unnecessary to banish any one to the Davos Platz, which does not begin to afford the advantages to be found in Colorado or New Mexico, and is nearly if not quite as expensive for the Englishman or American as a trip to the far West.

For the invalid going either to Colorado or New Mexico, one word of caution is necessary, and that is: lessen the dangers of hemorrhages by approaching the elevated regions *gradually*. Many lives are undoubtedly sacrificed by this hasty *rush* from New York to Denver or Santa Fé. The sleeping cars are luxurious and the dining cars excellent, but a rest for a few days in Chicago or Kansas City, and another rest half-way before reaching Denver or Las Vegas is most desirable, and will pay in the end without doubt.

The best season to go West is in the spring or fall, to be somewhat acclimated and settled before winter, and to avoid for the invalid the journey in hot, dusty cars in summer is not to be lost sight of. A well-filled lunch-basket, and a flask of good wine and another of brandy, besides some preparations of easily-taken beef-essence, like the London Manufac. Co.'s preparation, or Valentine's meat-juice, is very necessary for the safety of the invalid, and should not be overlooked. A preparation of coca wine, made by Theodore Metcalf & Co., of Boston, is the best single preparation for travellers that I know of.

This preparation of wine of coca of Metcalf's is desirable for the invalid after reaching either Colorado or New Mexico. Coffee and tea are too stimulating, and exert an injurious influence on the nervous system in these high alti-

tudes. Coca is desirable as a sedative to the nervous system, and at the same time a delicious, invigorating tonic. Constipation is very apt to trouble the traveller not only on the journey, but after his arrival in the new country, and some easily taken cathartic, like Brewer's tartrate of soda, in effervescent granules, or the new and excellent cathartic also manufactured by Metcalf & Co., of Boston—Rhamnus Frangula—will be found very valuable, and will obviate those distressing headaches and general malaise which a long journey is apt to induce. The traveller needs few medicines besides these mentioned. He is seeking for the climate cure, and if he obtains that to his satisfaction, the battle is won.

The hunting and fishing in New Mexico is not to be boasted about. Game is not plenty, and hunting can only be found away from the settlements and at considerable expense and trouble. There is some, to be sure, and the devoted huntsman will find it.

There are many interesting excursions to be made, and the ancient Pueblos offer considerable that is interesting in their history and customs.

As to business enterprises, I should hesitate a long time before advising any one to assume the risk either in "cattle and sheep ranches, mines, or manufactories." For professional men and especially doctors the prospects are gloomy in the extreme, and visitors are not at present numerous enough to offer any inducement to hope for practice from them; the native population would, to say the least, be very undesirable patrons. The schools are of course very inferior, and the territory of New Mexico is not a desirable place to bring up a child in the way he should go. To make the experiment of New Mexico for health is a lottery indeed, and while many may lose their all, *life and health may be found!*

The Atchison, Topeka, and Santa Fé Railroad from Kansas City is *the route to New Mexico*. It is a well-managed, comfortable, and even luxurious road, and the welfare of the travelling public is constantly attended to. The eating-rooms at the stations all along the road are excellent, and directly under the railroad management.¹

I have tried to explain the situation to the best of my ability. The physician must choose for his patient, and the patient must get the best information obtainable. To those going to New Mexico either for health or pleasure, there is much to be seen and learned of which this short paper cannnot treat. To all a pleasant, profitable journey is most sincerely wished.

¹ The following is a schedule of rates to Las Vegas Hot Springs:

	1st class.	2d class.	Round trip, good for ninety days.
Chicago	\$46 15	\$35 65	\$57 80
Kansas City	31 35	27 75	37 80
Atchison, Kans.	31 35	27 75	37 80
El Paso, Tex., to Hot Springs	22 80

ILLUSTRATIONS OF THE ANOMALOUS COURSE OF POSTERIOR SPINAL SCLEROSIS.

By E. C. SEGUIN, M.D.

THE typical or normal course of the disease variously known as posterior spinal sclerosis, progressive locomotor ataxia, or more briefly, tabes dorsalis, has become generally known to the profession by the dissemination of recent text-books of diseases of the nervous system and of monographs upon the disease in question. The writings of Charcot and Erb particularly have been of service in thus rendering familiar the numerous symptoms of tabes and their grouping into three stages, viz.: the pre-ataxic or neuralgic stage, second the ataxic stage, and third the pseudo-paralytic or bed-ridden stage.

I prefer grouping the symptoms of typical cases into two stages only, viz.: a neuralgic pre-ataxic stage, and a second or ataxic stage. The so-called third stage is simply an aggravation of the second without any new distinctive symptom.

I do not design to recapitulate the symptoms of posterior spinal sclerosis in this paper, chiefly for the above reason, and also because such a summary is accessible to every reader in Hammond's treatise on diseases of the nervous system, and in a lecture of my own on the "Diagnosis of progressive locomotor ataxia."¹

Non-typical cases of posterior spinal sclerosis while by no

¹ "Series of American Clinical Lectures," vol. iii., No. 12., N. Y., 1878.
Seguin, "Opera Minora," p. 353, N. Y., 1884.

means rare, are yet often puzzling and misleading. A record of them is desirable, and remarks on their semeiology and probable pathology may not prove wholly devoid of interest.

Numbness, paresis, and ataxia preceding fulgurating pains : antecedent scoliosis and syphilis.

CASE 1.—A male æt. 35, a broker by occupation, single, seen in September, 1878. Former health good; from youth has had an extreme right dorsal lateral curvature of the spine caused by persistent over-use of the right arm. Fourteen years ago, when 21 years old, had a chancre followed by some cutaneous eruption, but not by sore throat or osteoscopic pains. Remained well until two years ago, when slight numbness appeared in the left foot and leg, and progressively increased. The right foot became involved only in the last few months. During the past summer has noticed progressive weakness of legs, slow micturition, diminution of virile power. Has noticed no abnormal reflexes, spinal pain, cincture feeling, symptoms in hands or head.

Admits no sexual excesses and no injury to spine. The curvature is as it has been for many years.

No neuralgic or fulgurating pains in legs.

The examination showed weak but not atactic legs; left leg weaker. Marked anaesthesia of soles of feet and toes to aesthesiometer and needle. No muscular atrophy. The patellar tendon reflex and that from the soles of the feet are both lost. No mention of state of pupils.

A thorough anti-syphilitic treatment by means of mercury and iodide of potassium was carried out very carefully by the patient's physician, Dr. T. E. Satterthwaite. This was repeated afterward from time to time.

The consecutive notes of this interesting case are incomplete, but as the patient is still under observation I can give a fairly correct idea of the course of his disease. The paresis passed away in great measure. The numbness and partial anaesthesia remained, extending to the knees. Distinct ataxia, aggravated by closure of eyes, developed in the second year of observation (third of disease), and the first fulgurating pains not till 1880 or 1881, and these were rectal pains, apparently neuralgia of the rectum. Since 1881, occasional pains, sharp, momentary, or burning, in patches, developed coincidently with a low barometer, have occur-

red in the thighs and legs. These have never been severe or long continued; in marked contrast to the usual course of tabes.

The bladder and sexual organs recovered their power and remain normal. This, together with increased firmness in gait, constituting a veritable arrest of the disease, was brought about by nitrate of silver internally, spinal galvanization, and more especially by a course of spinal douches, done under the direction of Prof. Charcot in Paris during 1881.

At no time have the eyes presented symptoms; no diplopia, amblyopia, or Argyll-Robertson pupils. The arms remain normal. During the past winter only a few neuralgic pains have occurred, there was some increase in numbness and staggering, but the ataxia was no greater, and the patient has been able to attend to his business as a broker (office work only) with great regularity.

At the beginning this case presented the clinical picture of a subacute syphilitic myelitis in the lower part of the lumbar enlargement. In its second stage, where it now stands arrested (?) the symptoms consisted in ataxia, partial anaesthesia, absence of patellar reflex, and slight but characteristic fulgurating pains in the rectum and legs. Entirely abnormal to the usual semeiology of tabes are the absence of symptoms about the eyes, and the inverted order of appearance of the pains.

It might be argued that the case was one of central myelitis very low down at first, with secondary changes in the posterior columns, or more properly the columns of Burdach for a certain distance up the lumbo-dorsal cord. Considered in this way, the case (as well as the following) might be taken as favoring the theory that posterior spinal sclerosis is sometimes a secondary and degenerative lesion.

As regards therapy and prognosis the case is interesting. Anti-syphilitic treatment was most clearly called for, and it was carried out very thoroughly, the gums being slightly touched by mercury and iodide of potassium given in quite large doses up to 15. per diem. And the same remedies were

used more than once in smaller doses afterward. The symptoms of myelitis apparently yielded in part to this treatment, but the more strictly tabetic symptoms appeared and persisted. The unmistakable improvement, or check of the disease was obtained later by remedies which are more especially of use in spinal sclerosis, viz.: spinal douches, galvanism and nitrate of silver.

Acute double sciatica, followed by ataxia of the legs.

CASE 2.—A male, aged thirty-two years, married, a merchant by occupation. Seen July 6, 1880.

Was perfectly well until three weeks ago. Had a chancre in 18—. Developed ten days after coition, followed only by "a few pimples."

About June 16th, after a hard day's work in New York calling on many friends, became much heated, and drank freely of cold lemonade. The next day had pain in abdomen and took Congress water without effect. On Tuesday, June 22d, had very severe pain in both sciatic regions, extending to the toes, most acute under the knees; no numbness. On the 24th came to the city from his country home, with same pain in both sciatic distribution; a sense of painful pressure and burning in the epigastrium. No loss of power in the legs. Iodide of potassium and salicylic acid were given freely without relieving pains, which were so severe that he had to use laudanum to obtain any rest. The pain was continuous, not stabbing or fulgurating. On the 27th still suffering the same bilateral sciatic pains; numbness appeared in the feet, rising steadily. On 28th could still walk pretty well, but from the next day (29th) noticed "weakness" of legs; the bladder acted slowly and imperfectly; there was pain in the dorsal part of the spine extending into the epigastrium. In the last two or three days the spinal pain has extended to level of the shoulders. The sciatic pain has ceased. The numbness is severe up to knees, and there is slight loss of sensibility of the skin, to level of waist; a trace of numbness has appeared in the fingers, cannot stand or walk without assistance. Has partial retention of urine and constipation. The muscles of the lower limbs are uniformly though but slightly atrophied. In sleep frequent jerking of legs.

Examination showed some paresis and slight uniform emaciation of the lower extremities. The patient can stand with assistance, but closing his eyes makes this impossible. The bladder is

full of urine, and the catheter draws off three pints. There is neither plantar nor patellar reflex. The chief symptom, however, is typical ataxia of the legs in the attempts to stand and in tests performed while lying on the back.

Without complete anaesthesia, there is marked diminution of sensibility, especially in the right lower extremity. The feet feel numb. No pupillary or other ocular symptoms, and no symptoms in the upper extremities.

The patient had had a chancre some years before, not (?) followed by secondary symptoms ; his body is free from cicatrices, and he has two children who are pictures of health. (A third healthy child was presented him by his wife in the year after his attack.)

The patient denied in the most formal manner having had any pains in his legs prior to the attack.

Treatment consisted in the systematic emptying of the bladder twice a day with carbolized catheters ; the use of small doses of mercury, and of full doses (up to 5. three times a day) of iodide of potassium, and the application of the galvanic current to the spine and legs. At the end of July was given strychnia.

A peculiar symptom was a severe "griping" pain in the left side of the thorax, from the shoulder forward at the level of the seventh and eighth intercostal spaces. The time of appearance of this pain is not noted, but on July 8th it is "nearly gone," and afterward gave patient very little trouble.

On August 8th the first attack of fulgurating pain is noted, as a stabbing, cutting pain in the internal aspect of the left knee, lasting eight hours.

The case was under observation and treatment two years, during which a certain improvement occurred. The muscles of the legs regained their size and power, the sensibility in a great measure returned, and the bladder (after two attacks of cystitis) recovered its function. But the ataxia remained, though diminished, as the patient was when last seen able to walk with one cane on a sidewalk or piazza several hundred yards, though with characteristic jerk. The fulgurating pains were experienced occasionally during the two years, less frequently, but just as severe and typical. The left side of thorax, though free from pain, was still the seat of a pressure paræsthesia.

This interesting case was quite tabetic in its character after the first eight weeks of its course, the symptoms then being fulgurating pains, ataxia, slight anaesthesia of the legs and

absence of patellar reflex. In its beginning, however, it is quite anomalous, and it is quite probable that the primary lesion was one localized upon the posterior columns of the cord at the end of the seventh or eighth dorsal vertebræ, mostly on the left side of the median line. Such a lesion would account for the severe epigastric and abdominal symptoms experienced at the beginning (dorso-spinal and gastric sympathy is well illustrated in spinal irritation cases), the distinctly localized pain with sense of griping or grasping in the left side of the thorax, in the seventh or eighth intercostal spaces. Such a lesion would also pretty well account for the seeming double sciatica. Many years ago, Cruveilhier showed that *paraplegia dolorosa* was almost pathognomonic of tumor compressing the spinal cord.

This supposed lesion was checked by treatment (?) but not before the conducting power, both for sensibility and for coördination, of the posterior columns had been seriously impaired. In the third week, when first seen, the ataxia of the legs was already extreme. There were also other signs of compression of the dorsal spinal cord, viz.: paresis of the legs and of the bladder (retention). In the seventh or eighth week, and later, the fulgurating pains showed themselves in various parts of the lower limbs, indicating slow sclerotic (or degenerative?) changes in the columns of Burdach below the level of the eighth dorsal nerve.

It is interesting to note in support of the theory of a primary localized lesion that while the thoracic pain was upon the left side, the opposite, right lower extremity was more anæsthetic than the left.

In spite of the absence of secondary symptoms and of transmission of syphilis to offspring and wife, it is possible that the lesion was a specific formation either in the dura mater or more probably in the external layer of neu-

roglia. Its increase was arrested at a certain point, but not before irreparable damage had been done to delicate nerve structures. The question has always been in my mind, would a very active treatment, by means of mercury and large doses of iodide of potassium at the very beginning of the spinal symptoms (fifth day of attack), have saved the patient's legs from permanent disability?

Precocious atrophy of optic nerve; locomotor ataxia.

CASE 3.—Mr. G. C., aet. thirty-six, seen in August, 1878 ; referred by Dr. Thos. R. Pooley.

About four years ago simultaneous appearance of diplopia, tendency to stagger or walk badly, and specks before eyes. Is positive that at that time and previously he had had no pains in his legs. In the course of a year the diplopia, which was due to paralysis of the left sixth nerve, diminished, but the sight of the left eye failed. From that time vision gradually became worse until lately he has only had perception of light. Dr. Pooley finds extreme atrophy of both optic nerves.

In the last few months patient has had somewhat sharp pains in patches upon the legs and thighs, occurring semi-periodically. The urine has been passed slowly of late. Denies any feeling of numbness in feet, but has had a sensation as of a ball under his feet, and has felt as if treading on rubber. Patient is aware that his staggering is not accounted for by blindness.

Sixteen years ago he had a chancre followed by "warts at the anus," but no other symptoms. Children healthy.

Examination : Optic nerves atrophied, but pupils are "equal and normal" (notes taken at the time). No symptoms in arms. Legs strong but distinctly ataxic ; more so when eyes are closed. The soles of the feet are slightly anaesthetic, but pricking is well felt. Absence of patellar reflex. No arthropathies or muscular atrophy.

This case belongs to a category which I suspect is not small. At least I have met with several such in which the amaurosis was coincident with or antecedent to the ataxic stage. At the present time there are two cases under my care in which, with very little ataxia, there exists complete loss of vision, in one case with atrophy of the optic nerves, in the other with slight ophthalmoscopic signs.

What is interesting to note is that in such cases we have not to do with an extended longitudinal sclerosis (at least judging by clinical signs), for in these three cases the arms remained normal at the time of last examination. The lesions in the optic apparatus and those in the dorso-lumbar cord doubtless arise under the pathogenetic law of sclerosis, which at present is wholly unknown to us. Cases of this variety, in which the optic apparatus suffers only, and the more numerous cases in which paralysis of one or more ocular muscles precedes (sometimes by years) the first or neuralgic stage of tabes, constitute an almost insuperable objection to the theory that posterior sclerosis is a degenerative lesion secondary to disease of peripheral nerves—an ascending degeneration.

Extraordinary prolongation of the pre-ataxic or neuralgic stage (29 years).

CASE 4.—In 1878 I was consulted by an artist, 57 years of age, for a "neuralgia," which had tormented him from his thirtieth year. The pains affected the lower extremities only until two or three years ago, when they showed themselves in the arms as well. Patient describes these pains as sudden, sharp, tearing, sometimes of atrocious severity, occurring in spots or patches of round or oblong outline. These pains recur in one spot for some time, varying from a few minutes to hours and days. In the course of these many years he has had foci of pain in nearly every part of the lower extremities, more especially near the knees and ankles. In the last few years the intervals between paroxysms have become shorter, and the pains have grown more severe. There is now mydriasis of the right eye, a condition which has existed thirty years without diplopia. A mere trace of numbness has made its appearance in the legs, detected only at times by rubbing the skin. The painful spots are hyperesthetic during the paroxysms. In the last few years the urine has passed slowly. The floor or ground feels normal under foot; no difficulty in walking. Examination shows dilatation of the right pupil, without diplopia; no changes in the optic nerve (patient worked at his art to the last). No ataxia of the upper and lower extremities. There is very slight staggering when patient attempts to stand with eyes

closed. The soles of the feet show slight anaesthesia to aesthesiometer test. Reflex from ligamentum patellæ lost. No paresis.

About two years after this first examination, Mr. A. died of a combination of renal and cardiac diseases. His spinal symptoms had remained unchanged ; no ataxia at any time.

The diagnosis of posterior spinal sclerosis was verified in the post mortem examination of the spinal cord ; a distinct sclerosis of the lateral parts of the posterior columns was found.

Prolonged neuralgic stage (12 years); early arthropathies.

CASE—5. A male patient sent to my clinic in 1877(?) by Dr. C. Williams. Has had characteristic pains in the legs for 12 years ; spots of pain hyperaesthetic at time of attack. Slight numbness of feet ; swelling in both knees in last two years ; no difficulty in locomotion.

Examination shows moderate anaesthesia and analgesia in feet and legs to knees ; absence of patellar tendon reflex. Chronic arthritis of both knee-joints with crepitations. Careful tests with eyes open and closed revealed no staggering or ataxia.

Prolonged first stage; development of general paralysis of the insane before ataxia.

CASE 6. An ex-army officer seen in July 1878. He was then 35 years of age and apparently in good health. Was much exposed during the war in 1864-5, and in the latter year had typho-malarial fever. Then enjoyed better health for several years. In 1876, while on duty in the far West, had two attacks of "cerebral congestion," in one of which he fell unconscious. This was followed by poor health, depression, and hypochondriasis ; was almost insane on the subject of abuse by brother officers, official neglect, etc. Left the army and seemed well again, though a strong feeling of professional disappointment was prominent in his mental state.

Mr. B. consulted me for a peculiar "neuralgia." As far back as 1872 he had had attacks of cutaneous pain, becoming more and more frequent and severe. Attacks irregular as to time and location, mostly below the waist ; a few lately in the arms. Pain is sharp, cutting, and tearing, affecting round or oval areas in the skin and subjacent muscles ; not at all in the course of nerve-trunks. The pains were at times extremely severe, and their seat was nearly always hyperaesthetic.

Has had no numbness, vesical or optic symptoms. No sexual excitement.

Examination showed absence of patellar tendon reflex, and a little staggering when standing with eyes closed.

In 1881 I met Mr. B., but under such circumstances that I could not examine him. I was able to observe, however, that his pupils were extremely small. He seemed to stand well during the conversation.

During 1883-4 the case rapidly developed into a very well-marked one of general paralysis, with exaltation. The following details were obtained from Mrs. B.:

Excepting for attacks of fulgurating pains Mr. B.— seemed fairly well until 1882. During the winter of 1882-3 he was often depressed, and was oftentimes found weeping and sobbing in his library. At other times was bright, hopeful, and even "high" without actual delusions. Of these abnormal psychic states the depressed periods were longer and more marked. During the summer of 1883 delusions and exaltation appeared. At times considered his wife insane; at others blamed her for his illness, because of refusal to have complete sexual intercourse. After he was placed (July, 1883) in the private institution where he now lives, he declared that his wife had feigned his insanity to get him incarcerated! Letters written in November, December, 1883, and January, 1884, are typical of general paresis in composition and mechanical execution. I saw him in February and he remembered me perfectly, as also my diagnosis of posterior sclerosis. He laughed at this, and stiffened out his leg and arm, and strutted about to show me how absolutely free from ataxia he was. He appeared prematurely aged; his speech was quick and quivering; his facial and lingual muscles showed fibrillary tremors. His walk was slightly ataxic, and there was no patellar reflex. The pupils were unequal in size and did not respond to light and shadow. During the past spring the patient had two epileptoid attacks, with semi-coma. This was followed by temporary right hemiplegia and aphasia. Later he was reported as quiet, childish, and full of exalted notions.

From 1872 to 1882, a period of eleven years, the chief symptoms in this interesting case were the fulgurating pains, absence of tendon reflex, and fixed pupils (?). The ataxia observed during the present year is hardly as distinct as we see it in ordinary tabes, and the walk resembles that of general paretics.

Cases of tabes terminating with symptoms of general paralysis are not very rare, but in all I have seen, the spinal symptoms were complete and advanced before signs of cerebral degeneration showed themselves. In the case related it seemed as if the dependence between the cerebral and the spinal lesion was doubtful. From what we know of the pathological anatomy of the two affections, it would seem that Mr. B—— had only a slight sclerosis of the columns of Burdach (the posterior radicular zones) at the same time that his cortex cerebri was the seat of advanced and rapidly progressing inflammatory action.

EDITORIAL.

NOTES OF A VISIT TO EUROPEAN MEDICAL CENTRES.

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NOT one of the European medical centres can compare with Berlin in the progress which has been made in the past decade. The new buildings of the chemical, physical, physiological, and pharmacological Institutes, the Surgical Polyclinic on Ziegel Strasse, the Woman's Hospital, and the pathological Institute of the Veterinary College, all beautifully built and splendidly—aye, elaborately—equipped, fill one with astonishment, and Yorick's phrase rises to the lips modified to : “They order this matter [of medical education] better in Germany.” In addition, the city hospitals, at the Moabit and Friedrichshain are important new clinical laboratories, which supplement the Charité and the smaller institutions, such as the Bethausen, the Augusta, and the Jewish Hospitals. There may be disadvantages in the paternal form of government under which our German colleagues live, but these are not evident in a survey of their university and hospital arrangements. Could the figures be obtained, it would be interesting to compare the total expenditure upon these in Berlin during the past ten years with that of London or New York. The conditions, of course, are not properly comparable, as private enterprise can scarcely enter into competition with lavish government expenditure. The progress so striking in medical institutions has been in keeping with the rapid development of the city

since the consolidation of the empire. From a dirty, ill-drained, mal-odorous, second-class capital it has changed to a bright, well-drained, bustling metropolis. Intellectually, too, it now holds the same position to Germany as London and Paris do to England and France. True, Leipzig and Münich are still formidable and successful rivals in certain departments. The medical societies are not excelled by those of any European capital in the number and importance of their scientific communications. In former days Virchow's voice was heard occasionally at the *Académie de Médecine* of Paris telling of some brilliant pathological discovery ; now Koch stays at home and expounds his discoveries in anthrax, tubercle, or cholera at the *Berliner medicinische Gesellschaft*. The number of students has steadily increased, and now reaches, in the medical faculty, about 900. Foreigners do not frequent the classes in such numbers as in Vienna. The system of short practical courses, specially designed for them, does not exist, but the "fereien" courses, in March and September, are attracting many English and Americans, and are becoming very popular. Many of the classes mentioned in the calendar after the names of docents and extraordinary professors are not given unless a sufficient number of students are forthcoming ; and, as this is not always the case, it not infrequently happens that foreigners, attracted perhaps by some special courses which they see announced, are disappointed and dissatisfied.

The Pathological Institute is but little altered, and it was very pleasant to sit in the same seat and attend again those celebrated demonstrations on morbid anatomy, the remembrance of which since 1873 had remained as an incentive in humbly following in a similar line of teaching. The splendid example set by Professor Virchow and his pupils in the manner of teaching morbid anatomy and the general technics of autopsies has been badly followed by British and American schools. For any one imbued with the spirit of Virchow's methods there is nothing more painful than to witness the ordinary hospital post-mortem, done perhaps by a junior assistant. The subject is one far too much neglected in the average college course in this country. Too often a student

completes his curriculum without the opportunity of making an autopsy, and without any instruction in details or methods, and as to a practical knowledge of the morbid appearances of organs, he is lucky if he has had a chance to feel a pneumonic lung or see a fatty liver. And yet, within a few months of the obtaining of his doctorate, he may be called upon in a coroner's court to give important evidence requiring a fair amount of pathological information. It is not, of course, practicable in all our schools to have well-equipped pathological laboratories, and in many good institutions the number of post-mortems annually available is small—not perhaps more than one hundred, but even with this number regular and systematic instruction can be given in the methods of performing autopsies; while a weekly demonstration on the fresh specimens, with "pickles" from the museum, will form a class at once practical and popular. At the end of two such courses a man will go up for his doctor's degree knowing the difference between hypostasis and congestion, and in exposing the calvarium will not begin his incision in the supra-orbital region. To their great loss, English and American students at Berlin do not attend this class in any number. As a teacher, Professor Virchow's vigor is unabated, and the care and thoroughness with which this great master performs an autopsy before the class is a lesson to be laid to heart. The laboratory at the City Hospital, Friedrichshain, under Dr. Friedländer, also offers unusual pathological advantages. The amount of material is as large as at the Charité, but no special instruction is given. The facilities for the study of the morbid anatomy of the domestic animals have greatly improved within the past few years. The new Pathological Institute of the Veterinary College is admirably arranged, and so far as horses and small animals are concerned, the material is abundant. The abattoir offers a very extensive field of observation, and one which can be freely utilized, owing to the kindness of Dr. Hertwig, the Veterinary Superintendent, and Herr Dunckler, the Pathologist. Except the contagious diseases, which, of course, are rigidly excluded, examples of all the ordinary diseases of cattle, sheep, and swine can be readily seen. It may be safely

affirmed that nowhere can parasitic affections be more easily studied ; but more on this subject when I refer to the modes of inspection carried on at this institution.

The special difference between the pathology of to-day in Berlin, and of ten years ago, is the extraordinary development of the experimental and culture methods applied to micro-organisms as the agents in the causation of disease. In this direction the Pathological Institute has been thrown somewhat in the shade by the *Reichsgesundheitsamt*, where Dr. Koch has done so much good work. One is startled at the rapid diffusion of a knowledge of these matters among the laity, explicable, no doubt, by the presence last year of the Hygiene Exhibition, and the demonstrations and lectures then given on the subject of germs and their development. The properties of various bacilli form subjects for table talk and, naturally, the amount of nonsense and pseudo-science which prevails is what might be expected. Everywhere the culture apparatus is seen, and it is rare to meet an assistant who has not got something under cultivation. There are no sceptics, at least, if there are any, they are "lying low" for the present. There were even murmurs against Virchow when, in the Reichstag, speaking on the cholera bacillus, he warned the members not to think the question finally settled with its discovery, and hinted that we were no nearer the eradication of consumption with all our knowledge of tubercle bacillus.

The relation of micro-organisms to anthrax and tubercle is accepted as quite settled, but the discussion wages hotly about pneumonia, diphtheria, puerperal fever, and cholera. On the last-named disease, the recently-published communications of the Berlin Conference have given much fuller and later details than were at my disposal. There can be no doubt of the constant presence of a peculiar bacillus-like organism, but of its precise relationship there will be for some time differences of opinion. Dr. Koch's communication will carry conviction to the minds of many ; those who know him best and who know his conscientious and painstaking mode of working will accept his conclusions without hesitation. The magnificent ovation which he received

on his return from India, and the handsome allowance granted by the Government were tributes to honest work and modest worth.

The attitude of many prominent men at the discussion on pneumonia, at the German Medical Congress, showed the temper of the times. There was an evident disposition to accept as specific the micrococcus which has been found in the exudation and sputum. Professor Jürgensen, who opened the debate, was most positive in his statements and treated the question as if practically settled. The facts of the case are briefly these: numerous micrococci are in the exudate within the air-cells in the sputum, but are not discoverable at all stages. An investing capsule was thought, at first, by Dr. Friedländer, to be a distinguishing feature, but it has been shown to be present in some cocci from the mouth. It is capable of cultivation on gelatine, and the form of growth is somewhat peculiar, possibly distinctive. Inoculation with the cultures, or the fresh exudate, induces a fatal disease in mice and guinea-pigs, characterized by serous inflammations and patches of lung consolidation, which is regarded as true pneumonia. Whether these cocci are peculiar to the disease or whether they are only the normal buccal and respiratory micrococci which have found in the exudate a suitable nidus for development, and whether the disease induced in mice and guinea-pigs is any thing more than a septicæmia, are questions which remain to be settled. Dr. Klein has written strongly in favor of this view. The micrococci are often difficult to demonstrate. The method recommended by Friedländer, and which gives good results in many cases, is that of Gramm (methyl-violet and iodine solution), but even when it fails we must not conclude that all cocci are absent. Professor Weigert has, on several occasions, demonstrated to me numerous cocci in the exudate cells in pneumonic lungs by a method which he has not yet published, when the ordinary methods proved quite futile. The communication of Emmerich is a remarkable one; he found in the stuffing between the floors of the dormitories of the prison at Amberg a micrococcus which he believed had been the cause of the repeated out-

breaks of pneumonia in the institution at intervals during the past twenty-five years. He cultivated it and produced a disease in animals similar to that described by Friedländer. Sand and mortar, the composition of the stuffing, do not seem to offer the most favorable nidus for the maintenance of micrococci, but in this instance even such a barren soil is referred to as crowded with colonies of these tenacious organisms. We want more light on such cases.

In spite of the amount of labor spent on the micro-organism of diphtheria, we seem still far from full and accurate knowledge of their characters and relations to this terrible affection. Dr. Löf-fler, one of Koch's assistants, has been doing a good bit of work on the subject. Among a multitude of bacteria and micrococci which are found in the membrane and adjacent tissues, two forms appear to have a possible connection with the disease—a chain-like micrococcus and a rod-shaped microbe with an enlarged end. Cultivation of the former and inoculation of it into animals kills them, and similar bodies are found in the internal organs; but there does not appear to be the slightest connection between the affection thus induced and diphtheria. On the other hand, cultures of the rod-shaped organism proved fatal with production of diphtheritic membrane at the site of inoculation, swollen glands, serous, and hæmorrhagic effusions, etc., and extensive diffusion of the microbes throughout the body. Curiously, these cannot be again cultivated—a very weak point in the evidence. The membrane which is produced by the inoculation of the rod-like body is practically identical with that of diphtheria. Dr. Löffler's specimens and animals were particularly interesting, and we may anticipate good results from the continuance of his investigations.

So also with puerperal fever. We seem still far from the discovery of the true contagium. Chain-like cocci have been found by many observers in many cases in exudation, the blood, and the solid organs; indeed, they seem to be the only forms of any significance which have been constantly met with. They are not distinguishable from the similar forms which occur in scarlet-fever, erysipelas and diphtheria. Pasteur and others have culti-

vated this microbe, as obtained from the blood during life, but without leading to any very definite results. A series of investigations is being conducted on the subject by Dr. Tomer of the University Woman's Hospital, in conjunction with Dr. Iovanovic of the *Reichsgesundheitsamt*. In one case of well-marked puerperal fever blood taken with every necessary precaution was found to contain the micrococci, and was cultivated on gelatine to the eighth generation. The results of the inoculation with the cultures thus obtained are, as Fränkel's observations show, very uncertain. The present state of our knowledge, while not enabling us to speak with any degree of certainty, justifies the anticipation that ere long more positive information will be forthcoming—information which, at any rate will throw light on the vexed question of the relation of puerperal fever to diphtheria, scarlet-fever, and erysipelas.

It is a curious circumstance that Actinomycosis, known in Germany since the publication of James Israel's case in 1876 and Bollinger's article in 1877, should, so far as human cases are concerned, be confined to the country of its discovery. So far, no instance has been recorded in England or America. It is stated that the case of Mr. Treves of London, did not turn out to be genuine. In France they have only just woken up to the existence of the affection, and the article in the *Revue de Médecine* for April last is quite exhaustive. No doubt careful observation will reveal cases in this country, where the disease prevails rather extensively in cattle, more so, indeed, than among German stock, judging from a somewhat limited observation of the latter. Being familiar with the disease in cattle it was interesting to have an opportunity of seeing a case in the human subject. A woman about 30 years of age was admitted into the Charité on March 1st suffering from abscesses in various regions ; one over the sternum very soon burst and formed an extensive ulcer. After about two months' residence, and a course of illness resembling chronic pyæmia, she died in collapse. The pus was examined during life, but no diagnosis was made ; it was thought possibly to be malignant pustule. The autopsy revealed numerous abscesses

about the size of a walnut in the subcutaneous tissue of various parts, some of them large and confluent, necrosis of the sternum and costal cartilages and perforation of the pericardium and thickening with union of the layers. Small abscesses in right ventricle, in the kidneys and liver, and in some of the bones. In the intestines there were ulcers and small abscesses, and in the colon a sort of diphtheritic process. In the pus from these widely-distributed abscesses were found the small grayish-yellow nodular bodies characteristic of the actinomycetes. These can be seen readily with the naked eye and are quite distinctive—round in form and half the size of the head of a small pin. These granular bodies are usually more or less calcified, and the pus when rubbed between the fingers may feel quite gritty. In this case the actinomycetes granules were softer, but each contained the well-defined radially arranged tufts of this most remarkable fungus. Chronic abscesses with bone disease have been the prevailing features of the majority of recorded cases of actinomycosis—twenty or thirty in number. This one was peculiar in the extent and character of the affection of the bowels; the ulcers of the small intestines seemed directly due to the bursting of small abscesses, and the diphtheritic process in the colon appeared consequent upon the presence of the actinomycetes in the deeper parts of the wall of the intestine. The teeth were carious, but there was no evidence to be obtained as to the origin of the trouble or the point of entrance of the fungus. Dr. Oscar Israel has cultivated the fungus, but there are still points in its biology which need clearing up. It is not a little remarkable that the affection should differ so in cattle and in man. In the former it is almost invariably local, confined to the jaw (lower), the tongue, or the pharynx, rarely occurring in the internal organs and not always producing active suppuration. Indeed, the majority of actinomycotic jaws which one examines present no suppuration. In man, on the other hand, the cases resemble chronic pyæmia, there is bone disease with multiple abscesses, and there is wide-spread generalization, as in the case here mentioned.

Additional interest has been lent this subject by the alleged dis-

covery of actinomycosis in swine—in the muscle, not in the jaw or bones. The fungus lies within the sarcolemma, and produces degeneration of the muscle substance, but no suppuration. The degenerated fibres can be seen as opaque white streaks among the normal ones. The observation of Herr Dunckler, at the Berlin abattoir, has been confirmed by Prof. Virchow and Dr. O. Israel, rather prematurely in the opinion of many competent observers, who deny that the appearances in question are in any way produced by a fungus. A careful study of many specimens has not been fully convincing, but of this more on another occasion and in another place.

Professor Goltz and his dogs excited no little attention in April, when his demonstration at the Medical Congress aroused the partisans on either side, and the question of cerebral localization for the moment became all-important. How old the question now seems! and yet it was but at the time of my last visit that Fritsch and Hitzig were making their famous observations. "Knowledge grows but wisdom lingers" may be well said of this subject, about which we have learned so much in the past decade, and yet seem to have so little of that *wisdom*, or full truth, which is above the reach of controversy. The dog which Goltz brought from Strasburg, was stated by him to have had removed the entire motor zone, as understood by Fritsch and Hitzig, at two operations, Oct. 10 and Nov. 18, 1883. The dog, to a superficial observer, seemed to behave in a perfectly natural manner, and was not paralyzed either as regards motion or sensation. The animal took food well, was friendly, gave the paw, and was quite intelligent. The sensation of the feet appeared to be a little dulled. Similar results always followed this operation, and Professor Goltz regarded the very foundations of the localization theory shaken by such experiments. Although not paralyzed, Goltz observed that animals from which large sections of the anterior part of the brain had been removed, presented a curious motor disturbance—a loss of delicacy and aptness in the movements. In gnawing a bone they did not hold it deftly with the foot, but there was a very evident clumsiness, and the same was most marked in their at-

tempts to take a bit of meat held up before the mouth—several trials being needed for a successful seizure. There were one or two curious reflexes in these animals—thus, when the root of tail was rubbed, the tongue was protruded ; and when the head was stroked, the animal would push the head against the hand with force, and even make rotatory movements. Another curious circumstance was the alteration in disposition consequent upon removal of the anterior parts of the brain. The dogs became ill-tempered, irritable, and in marked cases the condition resembled rabies. This was in striking contrast to the state of animals from whom extensive portions of the hinder part of the brain has been removed, as they become, even if previously cross and savage, quite good-tempered and confiding, as if the organ of mistrust and suspicion had been removed. The dog was killed the following morning at the Physiological Institute, and its brain given to Prof. Fritsch for examination, and as in the case of the dog shown at the London Congress, the destruction was not nearly so extensive as supposed. Goltz stated that “the gyrus sigmoideus to the level of the corpus callosum had been removed,” and that the sulcus cruciatus and the neighboring parts would be found wanting. It was certainly a surprise to many to find how comparatively limited the lesion was ; in fact, the dog retained by far the larger part of the motor area on both sides. At a meeting of the *Ver-rein für innere Medicin* some weeks later, Prof. Fritsch showed the hardened brain on which the limitation of the lesions could be more accurately traced. Figures will no doubt be published, and will show that this dog, like the London one, has not been very favorable to its master’s views.

Berlin possesses a model cattle market and abattoir, which presents many interesting aspects for the sanitarian, inasmuch as the questions of disinfection, inspection, and the like, appear here to have received unusual attention. It occupies a district of many acres at the eastern border of the city, with special railway facilities and ample accommodation for both market and slaughtering purposes. The total expenditure has been about two and a half millions of dollars. Of the cattle market we need not speak,

although the general arrangement and the modes of disinfection of cars, stalls, etc., are important sanitary questions. The abattoir is for the city and district, and private slaughtering is rigidly forbidden. With the exception of swine, the animals are killed in small stalls, not in large abattoir halls, as is customary here. This was a concession to the butchers, who can in this way have their private stalls. For purposes of inspection there is a staff of 141 persons, viz.: the Veterinary Superintendent, Dr. Hertwig, eleven Veterinary Surgeons, eight Inspectors of the trichinæ department, eighty-six microscopic examiners, thirty sample procurers, and four stampers. The inspection is both ante- and post-mortem. The former takes place in the stalls of the abattoir, and any condemned animals are handed over to the veterinary police. The post-mortem examination of cattle and sheep is entirely macroscopic and easily performed. Every carcass is thoroughly inspected within a few minutes after death, when, if healthy, it receives the proper stamp; but if any parts are diseased, as liver or lungs, they are confiscated. The extraordinary number of 128 persons are occupied in the examination of swine, chiefly in the microscopic inspection for trichinæ. The coarse inspection is performed by veterinary surgeons, and is directed very largely to the detection of cysticerci (measles), tubercle, etc. Each "sample-taker" removes four pieces of muscle from each animal—from the rectus, abdomenalis, the diaphragm, the laryngeal muscles, and the intercostal—which are placed in a little numbered box, the number of which is stamped on the hog and entered in a book. When ten or twelve little boxes are filled, they are taken to the microscope room and given in charge of one of the inspectors. This department is most interesting, and constitutes an histological laboratory with eighty-six workers, half of whom go on duty in the morning, and the other half in the afternoon. Four of the inspectors direct each division. These workers form part of a large army of persons who are engaged in Germany in the examination of swine-flesh for trichinæ. To qualify for the position a person must receive a certain number of lessons in the microscope and in the examination of trichinous

flesh, and pass the prescribed examination. Each one provides himself—or herself, for there are many women engaged in the work—with a microscope, which must have a magnifying power of fifty or sixty diameters. The little boxes with bits of muscle are distributed among the workers, and from each bit six small portions must be teased up and examined microscopically. A great saving of labor is effected by the employment of a large plate-glass slide, 21.5 cm. by 4.5 cm., which is ruled into twenty-four compartments, on each of which a small bit of muscle is spread. A similar-sized plate of glass fits upon this, and is screwed down, so that by pressure the bits of muscle are well flattened, and any trichinæ which may be present are readily seen. If detected, the animal from which the muscle has been obtained is at once known, as a strict record is kept, and the carcass is confiscated and destroyed.

The following figures will give an idea of the value of the inspection. For the six months ending 30th September, 1883, there were killed (about) 44,000 cattle, 42,000 calves, 94,000 sheep, and 103,000 swine, in all 278,000 animals. Of these, 79 oxen, 9 calves, 6 sheep, and 697 hogs were confiscated. Of the total number there were found tuberculous, 681 oxen, 2 calves, and 765 hogs, and on this account 67 oxen, 2 calves, and 46 hogs were totally confiscated and 2,898 single organs. It is only when an animal is extensively diseased and emaciated that the entire carcass is destroyed—otherwise the tuberculous organs are alone confiscated. The great prevalence of tuberculosis in swine is noteworthy; they appear in Germany to be more often affected than cattle. For the presence of cysticeri or measles 488 swine were confiscated—or rather boiled down for fat. There were 121 trichinous hogs—rather more than 1 per 1,000—two of which were also “measled” and several times a small distome was found in the muscle. Thus the 128 workers in this department during the six months found 121 trichinous hogs. It seems a small result for the enormous amount of time and labor expended, to say nothing of the cost of the inspection, but we must consider the other side of the question. A single badly-infected

hog may, if it escapes detection, spread disease and death broadcast in a community given to raw *Schinken* and *Wurst*. The recent epidemic at Emmersleben illustrates this. The town and district had 760 inhabitants with one butcher and an old barber for meat inspector. The custom of eating raw chopped pork on bread was very prevalent, and on the 14th and 15th of September last a large amount of this was distributed among the villagers with the result in a few weeks of producing 257 cases of Trichinosis with fifty deaths. Even with inspection there is danger, particularly in country districts where the examination is liable to be careless, and where an inspector must possess unusual patience to examine, with perhaps negative results, several hundreds of animals, and keep up the necessary degree of watchfulness. The only safeguard is in the total disuse of raw pork, but it will take many years to educate Germans to this point. There can be but little doubt that the immunity enjoyed by the people of the United States is due to the habit of thoroughly cooking pork which so generally prevails. Whether American swine are more often trichinous than the German is a question which has received very contradictory answers—answers which in some instances appear to have been given largely on commercial or national grounds. Virchow has stated that the dangers are greater from native than from American pork; the latter is of course smoked and pickled, but the records of inspection at Hamburg and Havre show, beyond a doubt, the great prevalence of trichinæ in the pork exported from this country. From 1878-1883 there were 335,840 inspections at Hamburg of American hams and sides, of which 3,470 were affected, and in the same period 304,725 inspections of native animals, hams and sides, of which only eight were trichinous. And when we remember that time and again animals have been infected when fed with pickled or smoked trichinous flesh we are less surprised at Bismarck's vexatious restrictions and at the outcry in Germany at the laxity of the United States government regulations regarding the inspection of swine.

The two city hospitals are well ordered institutions, presenting

in many respects an interesting contrast. That at Friedrichshain, completed in 1874, is both medical and surgical, and has accommodation for six or seven hundred patients. Dr. Riess has charge of the medical wards and Dr. Hahn of the surgical. The situation of the hospital is magnificent—in the midst of a beautiful park, and the pavilions are far apart and surrounded by trees and shrubs. The buildings are very substantial, brick, faced with stone; the medical portions of two stories, the surgical of one.

The abundant clinical material is not utilized for teaching purposes but visitors are warmly welcomed by the courteous directors, and a morning round on either side shows an extraordinary variety of instructive cases. The Moabit Hospital, under the charge of Dr. Paul Guttmann, consists of twenty-four pavilions of the simplest possible type. Each consists of a single ward with thirty beds, a small pantry, a nurse's room, and a waiting room. The construction is extremely plain—coarse brick walls and a thin board roof, covered with tar cement. There are large double doors at either end which can be opened wide for ventilation. The heating is by steam from a central building. The cost of each was about 3,000 marks. This hospital is largely for epidemic and contagious diseases, and has no surgical wards. The patients are drawn from the lowest classes in the city, and are often brought to the institution in such an enfeebled state that treatment is unavailing. The mortality is in consequence very high. Of 2,599 patients treated last year 566 died. On going through the Berlin hospitals one is struck by the appearance of the inmates who seem drawn from more impoverished classes than with us.

The custom of placing one or two men in charge of a large hospital seems odd to us and has both advantages and disadvantages. Thus, Dr. Guttmann is responsible to the city authorities for the care of about 350 patients at the Moabit institution and is, of course, allowed a staff of assistants on whom necessarily a large proportion of the work falls, and in some cases the treatment is entirely in their hands. At the city hospitals the rotation of assistants is much more rapid than at the University clinics,

where they gladly remain for years at small salaries for the sake of the opportunity of making reputations as clinical workers. At the Charité the wards of Frerichs, Leyden, and Westphal are clinical laboratories utilized for the scientific study and treatment of disease, and the assistants, under the direction of the Professor, carry on investigations and aid in the instruction. The advanced position of German medicine and the reputation of the schools as teaching centres are largely fruits of this system.

NEW BOOKS AND INSTRUMENTS.

A Practical Treatise on Disease in Children. EUSTACE SMITH, M.D., Physician to East London Children's Hospital and to the Victoria Park Hospital for Diseases of the Chest. New York : William Wood & Co., 1884, pp. 884.

In this volume Dr. Eustace Smith, already so favorably known by his monographs on the wasting diseases of children, has given the profession an excellent treatise, and one by no means superfluous in English literature. For, although the main outlines of the subject are necessarily the same as in several other well-known systematic treatises, yet they have been modified by Dr. Smith in many details, so as to give a sufficiently individual stamp to even the didactic part of his own descriptions. These are, moreover, admirably illustrated by clinical histories which are extremely well selected as types, not of routine cases of disease, but of the more puzzling combinations of symptoms for which the less experienced practitioner, especially, requires an authoritative precedent.

The classification of subjects in a systematic treatise cannot fail to indicate the author's views on several points of doctrine. It is interesting to compare the classification adopted by Dr. Smith with those of Meigs and Pepper (7th ed., 1882), Henoch (1881), and West (7th ed., 1884), who profess to make none. Thus, under acute infectious diseases, Dr. Smith includes pertussis, erysipelas, and cerebro-spinal fever. Meigs and Pepper define the same group as "general diseases resulting from special morbid agents operating from without," yet exclude from it pertussis, which is placed among respiratory diseases. West assigns a chapter to fevers, which includes typhoid, variola, measles, and scarlatina, but excludes every thing else, while not only pertussis but diphtheria are referred to respiratory diseases. Finally, Henoch, who has special and valuable chapters on diseases of the new-born

and of the lactation period, omitted in the other treatises, refers to them descriptions of erysipelas and syphilis, and again places pertussis among respiratory diseases, although distinctly recognizing that it rather belongs to the infectious group.

Dr. Smith's second chapter contains a singular grouping. Under the title "General Diseases not Infectious," he classes together rickets, ague, rheumatism, and gangrene. The usual place for rickets, among diathetic diseases, seems much more correct. Ague deserves to be classed etiologically among diseases due to specific morbid poisons; and if the classification of gangrene is difficult, the difficulty is certainly not simplified by associating this singular affection with rickets and rheumatism. Dr. Smith is the only one of the four systematic authors we have mentioned who devotes a special chapter to spontaneous gangrene which he apparently identifies with Raynaud's "asphyxia of the extremities."

The lesion thus described, however is not limited to the extremities of the limbs, but may occur in scattered spots on any part of the surface of the skin, and is especially frequent on the genital organs. Gangrene of the mouth and lungs are considered apart. The occasional apparent development of pulmonary gangrene from a pneumonia, might seem at first to justify this separation. But the author points out that "in cases where lobar pneumonia ends in mortification of the lung, the gangrenous lesion cannot be looked upon as a natural consequence of the pulmonary affection. * * * The mortification of tissue is induced by something superadded to the original lesion," and this seems to be various conditions, embolic, or unknown, which will cause complete stasis in nutrient blood-vessels. By this, the proximate etiology is certainly assimilated to that of cutaneous gangrene, if, with the author, we accept the theory of Raynaud, that in "local asphyxia," there is a spasm of arterioles, followed by a migration of blood corpuscles and transudation into the skin. In cancrum oris again, the smaller blood-vessels of the diseased cheek are obliterated by coagulæ, and gangrene of the lungs and genitals frequently coincides. There is therefore no philosophic reason for assigning these three varieties of gangrene to as many different chapters. But for convenience of clinical reference, this sort of reduplication—in which the author skilfully avoids repetition—has considerable advantage, and several illustrations of the method occur in his book. It is remarkable, however, that Dr. Smith should admit that a nervous spasm of

arterioles, constituting attacks of local asphyxia which last but a few hours, should ever be the cause of gangrene. "Children, the subjects of this tendency to spontaneous mortification, are liable to attacks of what has been called 'local asphyxia.' * * * These attacks do not always subside harmlessly. In some cases the symptoms grow slowly worse, and the affected part becomes gangrenous." Much more consistent with the character of the phenomena is West's statement, that gangrene, of any locality, is a "blood disease." It really bears much resemblance to one of Pasteur's artificial septic diseases—malignant œdema;—and it seems far from improbable that a special form of microbe will be found as the proximate cause of the neurosis in the human species.

Other unusual chapters in a treatise on children's diseases are those on leucocythaemia, lymphadenoma, enlargement of the spleen, anaemia, haemophilia, scurvy, megrim, otitis and its consequences, spasmodyic spinal paralysis, idiocy, fibroid induration of the lung, suppuration about the larynx, foreign bodies in the air-tubes, paroxysmal dyspnoea, ascites. Six chapters are devoted to diseases of the liver, and four to those of the kidney. Tuberculosis of the lung is treated with acute—*i. e.*, general tuberculosis, and a separate chapter consecrated to pulmonary phthisis. Dysentery is separated as a "specific disease," from non-specific simple inflammation, or entero-colitis. On the other hand, tabes mesenterica is merged in a general description of scrofula. "It is now known that the symptoms are due, not to the mesenteric swellings, but to the lesion of which they are the consequence, and that the caseous glands form a part, and often only a very insignificant part, of the disease." The author adds: "Of themselves they form a strong argument against the tubercular theory of scrofulous glandular enlargement: for caseation of the mesenteric glands, unless their size be such that they press upon neighboring parts, is in itself a by no means serious matter."

Bronchial asthma is described as one of the forms of paroxysmal dyspnoea, of which the others are stridulous laryngitis, pressure upon the trachea by swollen bronchial glands, and obstruction of a bronchus by a foreign body. True asthma is usually associated with emphysema, but may occasionally be a pure neurosis. The author notes as singular that this neurosis should be so rare in children, in whom other forms of nervous spasm are so common, "one of the peculiarities of early life."

These re-arrangements and partial reduplication of subjects, by consideration of them from more than one standpoint, help

to render Dr. Smith's treatise usually full and complete for practical reference. There are, however, omissions. Thus, as already mentioned, there is no chapter on diseases of the new-born; none on diseases of the nose; and the chapters on both heart and skin diseases are extremely cursory. The section on nervous diseases contains no chapter on hysteria. A regrettable defect in the book is the entire absence of precise bibliographical references. No array of authorities is anywhere attempted, and discussions on rival opinions, and on pathogenetic reasonings are either brief or altogether omitted. References, however, to recent observations and experiments, are frequent and apposite, yet lose much of their value because it is impossible for the student to verify the quotations, unless already familiar with the author from which they are made.

Among such pathological experiments may be cited those of Braidwood and Vacher, who examined the air expired by measles patients, by making them breathe through glass tubes coated with glycerine. The microscope afterward revealed in this glycerine numerous sparkling, colorless bodies, spherical and elongated. The same observers confirm the observations of Naumann, on the great proliferation of cells in the rete malpighii, extending along the hair and sweat ducts into the glands; and, in addition, claim to find in the skin the same sparkling bodies discovered in the breath. Similar cell proliferations in the rete mucosum exist in scarlet-fever, so that both these eruptions are removed from the category of hyperæmias. In scarlatinous uræmia, the potash salts of the blood have been found increased to three times the natural proportion, and of this two thirds were contained in the serum, and not, as in healthy blood, in the red corpuscles.

The opening paragraph in the chapter on anemia, sums up the physiological conditions which predispose to the disease, from the researches of Davis, Poggiale, Wiskemann and others. "It appears that, in infancy, although the quantity of blood is greater than it is in mature life, in proportion to the entire weight of the body, this blood is of lesser specific gravity, contains more white corpuscles, less fibrine and soluble albumen, a smaller proportion of salts, and a considerably smaller quantity of hæmoglobine. With this comparatively dilute blood, the growing child has to undertake a larger work than is required from the adult. He has to supply material for growth and development; * * * the heart is forced to greater efforts to drive a sufficient quantity of blood along the relatively wider arterial channels; the lungs, to

aërate the larger proportion of blood carried to them by a more capacious pulmonary artery. The lungs eliminate carbonic acid in far higher proportion than is the case in older persons. The amount of urea excreted by the kidneys is relatively much greater than it is in the adult. The work required from the different secretory and excretory organs, whose united labors go to build up the growing frame, may be judged from the fact that, within twelve months of its birth, the body has increased to three times its original weight."

This description is both concise and clear, but it seems to us to involve a certain confusion of ideas that is often met with on this same subject. The amount of haemoglobine in the blood, *i. e.*, the amount of oxygen, does not require to be proportioned to processes of growth, but to those of function. When tissue-growth predominates over nervo-muscular function, the demand for oxygen diminishes. Thus, both in childhood and pregnancy the amount of oxygen is less, but the loss is not felt, for there is less functional demand to be supplied. Again, the wide arteries of infancy do not increase, but facilitate the work of the heart. And as the rôle of lung tissue in respiration is purely passive, it cannot be said to be "forced to greater effort," because more blood is brought to it by a wider pulmonary artery. Further, this relative activity of the pulmonary circulation, tends to diminish the dangers of pneumonia, even if it increase the frequency of the disease.

The chapter on scrofula, includes a brief description of spinal caries ; and might with advantage refer to other scrofulous diseases of the bones. The local consequences of glandular hypertrophy in the mediastinum are carefully described, and the various symptoms which result from their pressure upon blood-vessels and air passages. "It is possible that the bronchial glands may be occasionally the seat of tubercle, * * * but there is little doubt that the ordinary form of glandular enlargement is due to a very different cause"; by which is meant the irritation of different lymphatics in subjects endowed with a "singular activity of all the epithelial structures." To this special activity the author attributes the luxuriance of the hair, eyebrows, and eyelashes ; the frequent scaliness of the skin, the rapid growth of nails, finally the peculiar tendency to engorgement of the lymphatic glands by proliferation of their elements.

The relations of scrofula and tuberculosis are touched upon lightly ; the influence of softening cheesy matter in setting up an

infective process, alluded to, as also the (as yet unsettled) debate on the rôle of the tubercle bacillus. The author observes that the "tissues of scrofulous subjects seem to furnish a congenial soil for the growth of tubercle." It is certainly not premature to suggest that it is this very soil which is required for the development of the parasitic organism.

The diagnosis of acute tuberculosis in young children is carefully considered, and especial stress laid on the symptom of œdema of the extremities in the absence of albuminuria. "In young babies the only symptoms of the disease for a considerable time may be slight fever, pallor, some loss of flesh, an inelastic state of the skin, and a little œdema of the extremities."

The discussion on enlargement of the spleen from "simple hyperplasia" is a useful addition to the usual chapters on abdominal tumors, or to the usual incidental reference to the splenic enlargements which occur in the course of fevers, malaria, rickets, and syphilis. The writer points out that although the spleen may be enlarged in amyloid degeneration, it may become amyloid without being enlarged. A case is described in a child with slight rickets, where the lower border of the spleen was found to reach to the left crest of the ilium. We have seen a similar case in a child eight months old. In a child of a year, the spleen reached to the level of the navel, and there were some signs of rickets. After five months' treatment with cod-liver oil, fresh air, and nutritious diet, the child had cut ten teeth; seven months later had cut sixteen teeth, and the spleen was only just perceptible below the ribs. It is advisable, observes Dr. Smith, not to give iodide of potassium, nor mercurials, except in cases of syphilis; but to pay great attention to the nutriment and digestion, to protection from cold, and for medicine, to rely upon iron, cod-liver oil, quinine, and wine.

An interesting, and again an unusual chapter is devoted to scurvy. "As one of the diseases to which young children are liable, it has been, until recent times, completely ignored. Lately, however, owing to the observations of Drs. Cheadle, Geo. F. Barlow, and others, a form of the malady has been recognized as an occasional consequence in infants of bad feeding and injudicious management. In such subjects the disease is commonly grafted upon rickets; and there can be little doubt that it is this conjunction of the two maladies which constitutes the state described by Fürst and others under the name of *acute rickets*."

That more ricketty children are not subject to scurvy is proba-

bly owing to the fact that many articles of food which preserve from scurvy actually favor rickets. The deterioration of the blood in scurvy is not caused by the mere absence of potash salts, but by the absence of those salts in combination with organic acids. The neutral salts, as the chlorides, are increased; the alkalies diminished; hence dissolution of blood corpuscles and fatty degeneration of the muscles and of the secreting cells of the liver and kidneys.

One of the most characteristic morbid changes in infantile scurvy is subperiosteal hemorrhage, a late symptom in the adult. Conversely, the affection of the gums usual in adults may be absent altogether in children. Thus the earliest symptoms consist in signs of pain and crying by the child when handled; then cylindrical swellings of the limbs; finally separation of the epiphyses occurs, and crepitus may be detected on passive motion. At this stage the patient, who hitherto has kept the limbs flexed, lies with them extended and motionless, and no longer suffers pain from handling. The principal difficulty in the diagnosis is the exclusion of syphilitic pseudo-paralysis. In the latter case, says Dr. Smith, the child suffers from "enlargement of the spleen and all the signs of a profound syphilitic cachexia. The child is greatly wasted; is hoarse, and snuffles; the cranial bones are thickened, and the skin has the peculiarly dry, parchment-like appearance. In scurvy the patients are not, as a rule, greatly emaciated. Often their general nutrition is fair, and the special characteristics of syphilis are absent. If the gums are spongy, or signs of hemorrhage can be noticed in the skin or elsewhere, the evidence is strongly in favor of scurvy."

We do not feel sure that all cases of syphilitic pseudo-paralysis do present such unmistakable evidences of cachexia. We have certainly seen several presenting the clinical features of the bone disease, accompanied by a specific eruption, and yielding rapidly to corrosive sublimate baths, in whom there were no cachectic symptoms at all.

Croupous pneumonia is regarded as a general disease with marked local manifestations, its exudation being peculiar to itself and not to be produced by ordinary inflammatory agency. It should be classed with tonsillitis; is favored by bad drainage; but cannot, with our present knowledge, be attributed to specific infection.

The prognosis of croupous pneumonia is declared to be always favorable—that of broncho-pneumonia always doubtful, a statement whose gloom seems to us decidedly exaggerated, except in regard to diphtheritic pneumonias.

The chapter on collapse of the lung is usefully divided between two special sections, congenital and post-natal atelectasis. Acute phthisis is separated from pulmonary tuberculosis, and the term "restricted to cases of rapid catarrhal pneumonia, when, as a result of an acute inflammatory process, the air-cells become stuffed with epithelial elements which undergo rapid caseation, and the solidified tissue quickly breaks down into cavities." The prognosis of *chronic* phthisis is not unfavorable in a child who can be put in the best sanitary conditions.

The chapter on jaundice, though principally occupied with jaundice of the new-born, contains no reference to Buhl's disease, or the acute fatty degeneration of the liver, kidneys, and blood-vessels in the foetus or new-born.

In the chapter on chronic Bright's disease is described a peculiar condition of "renal inadequacy," or diminished functional activity of the kidneys. "The disorder is indicated by pallor, weakness, wasting, constipation, sometimes by sickness, and in every case by a remarkable absence of the natural elasticity of the skin. * * * There is no albuminuria, but the quantity of urine is small and the specific gravity low. Evidently sufficient solids are not discharged by the kidney, and the retention of effete matters in the system is apparently the cause of the symptoms." The average daily quantity of solids for a child should be five grains for every pound of body weight. A case is cited where the solids were no more than two and three quarter grains per pound. The remedy for such cases, which has proved successful, is brisk purgation, preferably by senna.

Directions for treatment are careful and precise throughout the treatise. Among these directions, however, we certainly should not agree to that on the quinine treatment of pneumonia. The author seems to speak less than usual from personal experience, for he says: "Quinine is strongly recommended by some authors as a valuable remedy * * * which is said to quickly reduce the temperature without weakening the heart * * * and for its supposed influence in checking the spread of the disease over the lung." The author advises "full doses," says that "children bear the remedy well," yet then recommends for an infant of twelve months only one grain three times a day, the quantity to be increased one grain and a half for every year of the child's life. These doses are really quite inadequate, and no judgment on the value of the treatment can be based on them. Dr. Smith also says that in case of great dyspnœa and threatened cardiac failure

from over-distension of the right heart, he "should not hesitate to take one, two, or more ounces of blood from the arm." But he does not as yet seem to have practised his own suggestion. It is asserted, assuredly wrongly, that local treatment of erysipelas is useless. Now we have records of several cases where the eruption was arrested by a band of carbolic-acid painting. Dr. Smith quotes a new method by Barwell, application of a thick coating of common house-paint, but does not seem to have tried it. One treatment is "invariably" used by the author in pertussis: sulphate of zinc ($\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$ of a grain) and atropine ($\frac{1}{2}$ drop of solution P. B.) twice or thrice daily; the atropine to be gradually increased to dilatation of the pupil. Rheumatic pericarditis is treated by neither ice nor poultices, but by a blister and iodide of potassium, and great efficacy is attributed to the treatment. In the treatment of infantile syphilis, the use of sublimate baths is, we think unadvisedly, ranked far behind internal treatment by gray powder or the perchloride ($\frac{1}{32}$ to $\frac{1}{48}$ gr. at a dose). For anaemia, as in other cases indicating the use of iron, especially rickets; Dr. Smith prefers the acid salts as sulphate or perchloride to the iodide syrup. The latter, he says, often occasions gastric catarrh by promoting acidity and flatulence, and encouraging the excessive secretion of mucus. Unusually large doses of iron are recommended—thus, 5 grains of the exsiccated sulphate three times daily, or 20 to 30 drops of the perchloride as often to a child six years old. For purpura, in occurring suddenly in healthy children, the "old plan of energetic purgation is peculiarly valuable. Often in such cases a course of iron or other tonic is followed by no benefit whatever, while a few doses of some drastic aperient cause a prompt and final disappearance of all haemorrhagic symptoms. * * * The best * * * is a combination of oil of turpentine with castor oil." For the treatment of megrim, Dr. Smith warmly recommends a combination of ergot and strychnia (10–15 drops of liquid extract of ergot with spirits of chloroform, and 2–3 drops of strychnia solution, P. B., three times a day). In most cases in young subjects, the attack itself may be "decidedly shortened by a dose (℥ xv–xx) of liquid extract of ergot with spirits of chloroform in camphor-water." The raw-meat treatment of inflammatory diarrhoea, formerly advised by Rousseau, is warmly endorsed by Dr. Smith. "At first it is only partially digested, and the decomposing residue gives a most offensive smell to the stools; but after a few days, especially if pepsin be taken, the meat soon ceases to be visible in the motions. By the above

measures strictly carried out, the most obstinate cases can be arrested."

We might sum up this review with the observation, that Dr. Smith's systematic treatise is an excellent expansion of his earlier monographs, not profoundly analytic, but giving vivid, accurate, and sufficiently comprehensive clinical pictures of disease, interpreted without anacronisms, and from thoroughly modern stand-points.

[M. P. J.]

Diseases of the Heart and Thoracic Aorta. By BYRON BRAMWELL, M.D., F.R.C.P.E., Lecturer on the Principles and Practice of Medicine, and on Practical Medicine and Medical Diagnosis, in the Extra-Academical School of Medicine, Edinburgh; Pathologist to the Edinburgh Royal Infirmary, etc. New York : D. Appleton & Co., 1884, pp. 784, with 317 Illustrations.

Dr. Bramwell is well known as one of the most energetic workers of the younger generation of physicians in Edinburgh, where he now holds—as he did at Newcastle-on-Tyne, his former home—positions in the Infirmary and extra-mural school, which ensure great clinical and pathological advantages. His work on the "Diseases of the Spinal Cord," published two years ago, was very well received, and has proved a most serviceable text-book for students. The present volume is, we are told in the preface, the outcome of fifteen years' study and observation on diseases of the heart, and the subject-matter of it was delivered, almost exactly as it stands, in the form of lectures to the author's class at the beginning of the winter session of 1883-84. The work bears many traces of its class-room origin, in the systematic arrangement, and in the innumerable—often tiresome—subdivisions of chapters and paragraphs. Here, as in the author's work on the "Cord," we are at once struck with the number and general excellence of the illustrations, in which respect it compares most favorably with all recent manuals on the heart. Dr. Bramwell is evidently a strong believer in the value of good figures, and of the whole number in the work more than half are original.

The preliminary anatomical and physiological observations are well up to date. Full use is made of Dr. Gaskell's work on the automatic mechanism of the heart, and of his suggestion that in man also it is possibly due to an inherent rhythmical property possessed by the muscle; and also of the recent contributions to cardiac physiology from the biological laboratory of Johns Hopkins University. This chapter will be read with great interest by

many practitioners who have not ready means of access to recent literature upon these subjects. The author very properly insists, when speaking of the relation of the heart to the minute blood-vessels, upon the necessity of taking an *all round* view of the circulation, and not limiting our vision to the central propulsive organ.

Speaking of the dyspnœa, among the cardiac symptoms, the Cheyne-Stokes respiration is very fully discussed—perhaps too fully, as thirteen pages are devoted to it. The conditions under which it most commonly occurs are dilated and fatty right heart, atheroma of the coronary arteries and dilatation of the aorta, and the phenomena are probably to be explained by supposing that periodical variations occur in the amount of oxygen supplied to the medulla. The respiratory centre “is the seat of two conflicting forces : one tending to generate inspiratory impulses (the discharging portion), and the other offering resistance to the generation of these impulses (the restraining portion) ; the one or other alternately gaining the victory, and thus leading to a rhythmical discharge.” Venous blood excites the action of the discharging portion and depresses the action of the restraining portion, and arterial blood may be supposed to act in just the opposite way. The centre is moreover supposed to be in a state of irritable weakness. Now, to explain a paroxysm, we may suppose, starting at a period of apnœa, that the venous blood gradually excites the dyspnœa by arousing the action of the discharging portion, and in consequence of the excessive irritability of the centre the discharges become excessive, and a condition of dyspnœa is produced, but the centre becomes speedily exhausted and the dyspnœa subsides. By the rapid respiratory efforts the blood (previously venous) becomes arterialized, stimulation of the discharging portion of the centre ceases ; stimulation of the restraining portion is produced and has full swing, inducing the condition of apnœa. Six diagrams are given representing the changes supposed to occur at the different periods of the Cheyne-Stokes cycle. Altogether Dr. Bramwell’s discussion on this point, though long in proportion to its importance, is exceedingly interesting and suggestive.

In chapter III. excellent details for the student are given upon methods of case-taking, and there is a good summary of the chief symptoms met with in heart disease. On the somewhat vexed point of the reduplication of the heart-sounds the author is, we believe, quite right in stating that the necessary conditions—in the

first sound—are considerable asynchronism in the contraction of the two ventricles with diminished duration of one or other or both of the component parts of the reduplicated sound and a slow action of the heart.

One of the most unsettled questions in cardiac pathology relates to the mode of origin of the functional murmurs, and we find it here discussed at great length, twenty-one pages being occupied in its consideration. We have a most exhaustive analysis of the three views, viz.: (1) That the murmur is produced in the pulmonary artery; (2) that it is due to mitral regurgitation, and (3) that it is caused by a constriction of the pulmonary artery by the dilated appendix of the left auricle. The arguments for and against the latter views are given in great detail, and the author concludes that the sudden propulsion of a large blood-wave of abnormal (spanæmic) composition into the pulmonary artery, which is possibly dilated, is the efficient cause; at the same time he agrees with Dr. Balfour in thinking that in many cases of advanced chlorosis, the systolic murmur which is heard at the apex is mitral and due to regurgitation, but he also thinks that it is a distinct one from that heard in the second left interspace.

Pericarditis is the first disease considered; the morbid anatomy is illustrated by eighteen figures, some of which are rather superfluous. Thus four plates are given showing the lymph and vegetations in the acute affection. Although a case is given, scarcely stress enough is laid on the occurrence of acute purulent (idiopathic) pericarditis, which is more common in children than is supposed. Among the accidental symptoms reference is made to the forms of mental derangement which occur in some cases, either as delirium, with the hyperpyrexia of rheumatic pericarditis, or as that peculiar mental derangement described by Sibson, Flint, and others—a taciturn melancholy with suicidal tendency, or in cases of hard drinkers it may assume the character of delirium tremens. Dr. Bramwell is very strong on tables of differential diagnosis, of which no fewer than seven are given in connection with pericarditis. We are sorry for the students in the medical class of the extra-mural school if they have the lively hatred of such tables which possessed the students of our time. Aspiration of the effusion is recommended when the action of the heart is seriously embarrassed, and in case of a purulent fluid the sac is to be laid open and a drainage-tube inserted.

The section on acute endocarditis—which is divided in acute and ulcerative forms—is well and clearly given. Ulcerative en-

docarditis is not thought to be a specific infectious disease like typhus. The clinical history is unusually full, and the types of *cardiac typhoid pyæmic* and *agueish* cases are recognized. The points of diagnosis are carefully given, and altogether it makes, perhaps, the best chapter on this disease in any English text-book. Under the treatment of endocarditis the question of the influence of the salicylates in rheumatism and upon the heart complications is fully entered into, and the author strongly advises the administration of full doses of pure salicin after the manner recommended by Dr. MacLagan, and thinks that "if this form of treatment were more vigorously carried out in the early stages of the attack, the frequency of endocarditis and other cardiac complications would be materially diminished."

The treatment of mitral regurgitant disease is divided into the periods of before and after the failure of compensation, and under the former, excellent general directions are given. The new remedies are not thought to be equal to digitalis in progressive cases. Arsenic is highly recommended as a cardiac tonic—one not enough used.

Chapter VI. is taken up with the consideration of acute and chronic endocarditis, hypertrophy and atrophy, and fatty degeneration. We were disappointed in not finding a section devoted to these not uncommon cases of hypertrophy and dilation, which are grouped under the unsatisfactory term—idiopathic. We want more light in the pathology of this class of heart cases. The patients are usually middle-aged men, powerfully built, often hard drinkers. They come under observation with all the signs of hypertrophy and dilation, the consequences of broken compensation, dyspnoea, and dropsy. After perhaps several such attacks, the patient finally succumbs, and on *post mortem* we find no valve disease and no renal affection, nothing, in fact, to account for the great hypertrophy and dilatation. We are accustomed to attribute the condition to hard work and alcohol, but how much is due to the one and how much to the other is very doubtful.

In connection with atrophy two plates are given of a very atrophic heart weighing only 1214 grs. (81 grammes), taken from a woman aged forty-five, dead of cancer.

In the chapter on cardiac neuroses, after speaking of neurotic palpitation, the important subject of angina is considered. Under the term *functional*, Dr. Braniwell includes a number of cases of heart-spasm and pain in young persons, under forty; it may be called pseudo-angina, and is not often fatal, but it may run into

the more serious form. The pain is attributed to irritation of the sensory-nerve filaments in the heart walls; possibly due to spasm of the heart muscle—like the extreme pain of cramp. Possibly too, the nerves passing along the coronary arteries, which are so often found diseased, may be implicated, and Peter has found extensive changes in the branches of the cardiac plexus. There are no new suggestions on treatment.

In devoting only sixty out of seven hundred and eighty-four pages to aneurism and diseases of the aorta, we scarcely think our author allows a just proportion to such an important subject. Among the physical signs no mention is made of Surg.-Major Porter's valuable suggestion, that in cases of suspected aneurism a sensation of tugging at the trachea can be distinctly felt when, by elevating the larynx, the windpipe was put upon the stretch. The sign is only present when the tumor presses upon the trachea, but in some cases we have found it of great value. The remarks upon diagnosis are excellent. An extraordinarily rare and interesting case is mentioned of simple dynamic pulsation of the aorta, noted by the author and Dr. Murray of Newcastle. In the treatment of aneurism by iodide of potassium, the drug is stated to act by reducing the blood pressure and relieving the tension within the sac, not, as Dr. Balfour supposes, by acting on the fibroid and muscular elements of the sac. Small doses do as well as large ones. Chloral in 7-gr. doses three times a day is advised for the same purpose.

On the whole, the work is one which will prove of great value to students and practitioners, and Dr. Bramwell may be congratulated on the production of so excellent a text-book. [w. o.]

Diseases of the Throat and Nose. By MORELL MACKENZIE, M.D., London. Vol. ii., Diseases of Oesophagus, Nose, and Naso-Pharynx; with index of Authors and Formulae for topical remedies. Illustrated. Philadelphia: P. Blakiston, Son, & Co., 1884, pp. 550.

In the preface we are told twelve years elapsed between the conception and birth of this book. If for no other reason than this assurance of its maturity, it is entitled to appear at a time when works in this specialty have become so frequent.

The gullet, the nose, diseases of the naso-pharynx, and an appendix on the contents, in as many sections. The anatomy of the part opens each of the first two sections, followed by a description of the methods of examination and of instruments, and the consideration of the various diseases by which the organ is

affected. The author introduces each disease by a list of its Latin, French, German, and Italian names. Then follows a definition, which most often is not a definition, but a translation of the Latin term with a few conditions and sequelæ. This we acknowledge is unavoidable, if definition is in all cases to be insisted upon. In medicine, too little is known for purposes of definition, and in most cases the attempt to define should not be made. Each disease is illustrated by the record of one or more cases.

At rare points the author exhibits a conservatism, but nowhere more so than in his adherence to the term "thrush," refusing to recognize the very natural division suggested by the parasitic character of one class of cases of thrush, and the non-parasitic character of the other class. This distinction has long been made by the French.

Farther on, we confess no little surprise that a disease as dangerous as gummosus syphilide of the gullet should have its treatment disposed of in a short paragraph and summed up in 10-gr. doses of iodide of potassium.

The operation of œsophagostomy and gastrostomy, which of late have received so great attention in surgical discussions, are considered to a full extent under "cicatricial stricture of the gullet." œsophagostomy is characterized as having "a narrow range of usefulness," as "a leap in the dark," and more "likely to find favor with the adventurous surgeon than with the careful practitioner." It is, however, recommended in syphilitic stricture of the upper part of the gullet, but the "diagnosis of syphilitic disease can never amount to any thing more than conjecture." Gastrostomy is classed with œsophagostomy in the following: "It can hardly be denied, however, that the benefit of these operations has often been shown more in the euthanasia which they have brought about than in any appreciable prolongation of the patient's life. In fact, judging from statistics alone, operative interference would seem to be attended with less satisfactory results than the milder palliative measures generally adopted." Apology is offered for the bad showing in the case of gastrostomy, and the prediction is made that its future will be more satisfactory. A case of cicatricial stenosis with gastrostomy is given in full, with notes of the post-mortem examination.

In the treatment of diseases of the nose, the author agrees, with others, in not having observed injurious effects from irrigation, but prefers sprays. We hold the "word of caution" in the treatment of hypertrophy of the nasal mucous membrane to be most opportune. With the snare and cautery at hand, the temptation

to operate seems to most, almost irresistible, where the author assures us that he succeeds "in effecting a cure by the simple removal of all causes of irritation and the persevering use of gentle dilatation." In the intractable cases, the electric cautery is recommended for the redundant tissue as "the most simple and efficacious."

Ozaena is given its right place. It is dethroned and given a place among the symptoms of a long list of different affections. The discussion of it comes here under the head of "Dry Catarrh" (which term the author defends against the etymological objection by Virchow). It may be observed that in considering the prognosis of dry catarrh, the contrast is drawn by implication between "dry catarrh" and "true ozaena."

Full consideration is given of the more recent discoveries in the relation between nasal tumors and cough, asthma, epilepsy, etc. But, the author denies that, the disposition to hay-fever lies in chronic hypertrophy of the mucous membrane of the nose.

This volume is most valuable to the general practitioner, as well as to the special student, because of the excellent selection of its subject-matter, its arrangement, its extensive bibliography arranged at the foot of the page with reference from the text, its completeness, and the unobjectionable work of the publisher.

[J. V. D.]

The National Dispensatory. By ALFRED STILLÉ, M.D., LL.D., and JOHN M. MAISCH, Ph. D. Third edition, Henry C. Lea's Son & Co., Philadelphia 1884, pp. 1755.

After an interval of five years a new edition of this now indispensable work comes to us much improved. It contains seventy-five pages more than the second edition, but the increase in material is much greater because the size of the printed page has been increased by nearly half an inch each way. This change in size of page was doubtless made to prevent the book from acquiring unwieldy thickness, but it is unfortunate in that it interferes with the shelving of the work with other large octavos.

The additions consist in new articles, more recent quotations of physiological and therapeutical experiments, and the insertion of nearly one hundred more illustrations. The general index has been elaborated and contains nearly four thousand more references than the former one.

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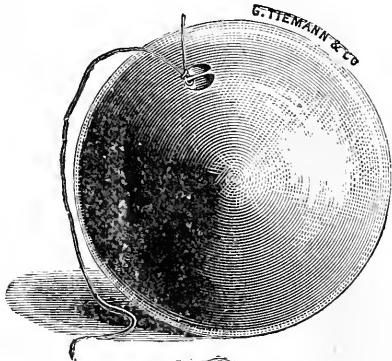
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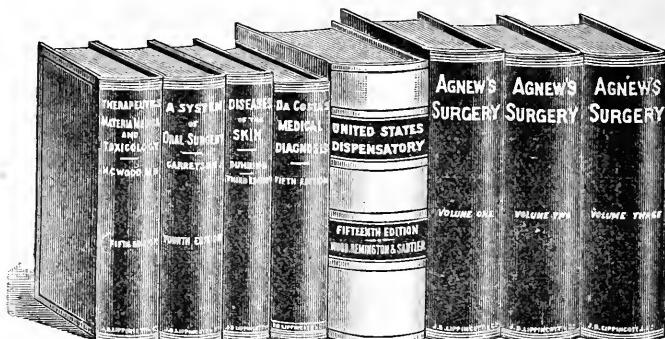
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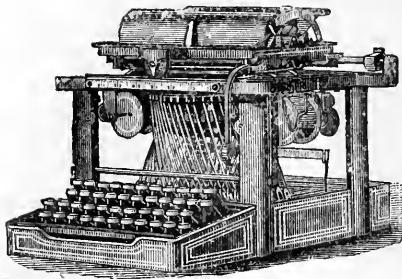
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1 Centimetre	0.01 = .393 "
1 Decimetre	0.1 = 3.937 "
1 METRE	1. = 39.370 "
1 Kilometre	1000. = .62 miles

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1 Milligram	0.001 = $\frac{1}{64}$ gr.
1 Centigram	0.01 = $\frac{1}{6}$ "
1 Decigram	0.1 = $\frac{1}{\frac{1}{10}}$ "
1 GRAM	1. = 15.432
1 Kilogram	1000. = 2.7 lb.

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1 fl. or 1 gr.	.06 grams
1 f. 3 or 1 3	= 4. "
1 f. 3	= 30. "
1 3	= 31. "
1 f. 3 Glycerine	= 37. "
1 f. 3 Syrups	= 40. "

TEMPERATURE.

37° Cent.	98°.6 Fahr.
38° "	100°.4 "
39° "	102°.2 "
40° "	104°. "
41° "	105°.8 "
1° C. = 32° F.	Multiply C. by 1.8 add 32=F.